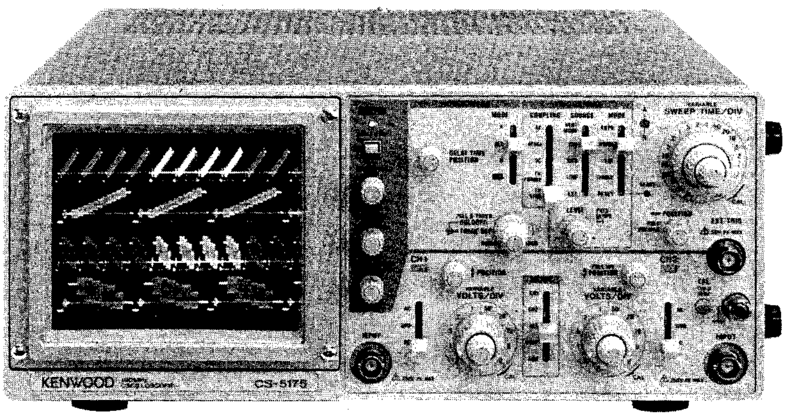
KENWOOD

100MHz OSCILLOSCOPE

CS-5175

SERVICE MANUAL


SWEEP TIME/DIV
VOLTS/DIV
VOLTS/DIV
KENWOOD
CS-5175

WARNING

The following instructions are for use by qualified personnel only. To avoid electric shock, do not perform any servicing other than contained in the operating instructions unless you are qualified to do so.

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SPECIFICATIONS

		CS-5175
CRT		150 mm rectangular with internal graticule
Acceleration Voltage		12 kV
Display Area		8×10 div (1 div=10 mm)
VERTICAL AXIS (CH1 and CH2)		
Sensitivity		1 mV/div to 5 V/div: 1 mV to 2 mV/div ±5%, 5 mV/div to 5 V/div ±3%
Attenuator		12 steps, 1 mV/div to 5 V/div in 1-2-5 sequence Vernier control for fully adjustable sensitivity between steps
Input Impedance		1 MΩ ±2%, approx. 30 pF
Frequency Response	DC	DC to 100 MHz, within −3 dB (5 mV/div to 5 V/div) DC to 20 MHz, within −3 dB (1 mV/div to 2 mV/div)
	AC	5 Hz to 100 MHz, within −3 dB (5 mV/div to 5 V/div) 5 Hz to 20 MHz, within −3 dB (1 mV/div to 2 mV/div)
Rise Time		3.5 ns (5 mV/div to 5 V/div) 17.5 ns (1 mV/div & 2 mV/div)
Signal Delay Time		Adequate to identify leading edge
Crosstalk		−40 dB or less (at 1 kHz)
Operating Modes	CH1	Single trace
	CH2	Single trace
	ALT	Two-waveform display, alternately
	CHOP	Two-waveform display, chopped
	ADD	CH1+(±CH2) added display
Chop Frequency		Approx. 300 kHz
Channel Polarity		Normal or inverted, channel 2 only inverted
Maximum Input Voltage		500 Vp-p or 250 V (DC+AC peak)
HORIZONTAL AXIS Input thru CH2, ×10 MAG not included		
Operating Modes		X-Y operation is selectable with HORIZ MODE switch CH1 : Y axis CH2 : X axis
Sensitivity		Same as vertical axis (CH2)
Input Impedance		Same as vertical axis (CH2)
Frequency Response	DC	DC to 1 MHz, within −3 dB
	AC	5 Hz to 1 MHz, within −3 dB
X-Y Phase Difference		3° or less at 100 kHz
Maximum Input Voltage		Same as vertical axis (CH2)
SWEEP		
Type	A	A sweep
	ALT	A sweep (intensified for duration of B sweep) and B sweep (delayed sweep) alternating
	B	Delayed sweep
	X-Y	X-Y oscilloscope operation
Sweep Time	A	0.05 μs/div to 0.5 s/div ±3%, in 22 ranges, in 1-2-5 sequence Vernier control for fully adjustable sweep time between steps
	B	0.2 μs/div to 50 ms/div ±3%, in 19 ranges, in 1-2-5 sequence
Sweep Magnification		×10 (ten times) ±5% (±8% in 0.05 μs-to-0.5 μs range)
Linearity		±3% (±5% for ×10 magnification)
Holdoff		Continuously variable from NORM to more than ten time (MAX)

SPECIFICATIONS

		CS-5175
Trace Separation		Shifts B sweep trace continuously in vertical direction by 4 divisions or more with respect to A sweep
Delayed Sweep		Continuous delay (AFTER DELAY) & triggered delay (B TRIG' D: triggered by A trigger)
Delay Time		Continuous adjustable from 0.2 μs/div to 0.5 s/div
Delay Accuracy		±4% of reading on CRT
Delayed Jitter		10000 : 1 of decupled time axis A set value
TRIGGERING		
Modes		AUTO, NORM, FIX, & SINGLE-RESET
Trigger Source	VERT MODE	Triggered by input signal selected with vertical MODE selector
	CH1	Triggered by CH1 vertical signal
	CH2	Triggered by CH2 vertical signal
	LINE	Triggered by line frequency
	EXT	Triggered by external trigger signal
External Trigger Input Impedance		1 MΩ ± 2%, approx. 30 pF
MAX. EXT. Input Voltage		50 V (DC + AC peak)
Coupling		AC, HFREJ, DC, TV-FRAME, & TV-LINE
Trigger Sensitivity	At NORM position	
	AC	Trigger frequency range 10 Hz to 50 MHz (INT: 1 div, EXT: 0.15 Vp-p) 10 Hz to 100 MHz (INT: 1.5 div, EXT: 0.2 Vp-p)
	DC	Trigger frequency range DC to 50 MHz (INT: 1 div, EXT: 0.15 Vp-p) DC to 100 MHz (INT: 1.5 div, EXT: 0.2 Vp-p)
	HFREJ	Trigger frequency range is more than 50 kHz, and minimum amplitude (voltage) required for sync is increased.
	TV	FRAME, LINE INT: 1.5 div, EXT: 0.2 Vp-p
	AUTO: Same as above specifications for above 50 Hz	FIX: 50 Hz to 50 MHz (INT: 1.5 div, EXT: 200 mV) 50 Hz to 100 MHz (INT: 2.0 div, EXT: 250 mV)
CALIBRATION VOLTAGE		1 V p-p ± 3%, square wave, positive polarity, approx. 1 kHz
INTENSITY MODULATION		
Sensitivity		+5 V, positive voltage decreases brightness
Input Impedance		Approx. 10 kΩ
Usable Frequency Range		DC to 5 MHz
Maximum Input Voltage		50 V (DC + AC peak)
VERTICAL AXIS SIGNAL OUTPUT (CH1 only)		
Output voltage		Approx. 50 mVp-p/div (50 Ω termination)
Output Impedance		Approx. 50 Ω
Frequency Response		100 Hz to 100 MHz, −3 dB/50 Ω termination (1 mV/div, 2 mV/div: 100 Hz to 20 MHz, −3 dB)

SPECIFICATIONS

	CS-5175
TRACE ROTATION (Electrical, adjustable from front panel)	
POWER REQUIREMENT	
Line Voltage	AC 100 V/120 V/220 V/240 V ±10%
Line Frequency	50/60 Hz
Power Consumption	Approx. 59 W
DIMENSIONS (W×H×D)	319 (341)×132 (145)×380 (455) mm ( ) dimensions include protrusion from basic outline dimensions
WEIGHT	9.2 kg
ENVIRONMENTAL	
Within Specifications	10°C to 35°C, 85% max. relative humidity
Full Operation	0°C to 40°C, 85% max. relative humidity
ACCESSORIES SUPPLIED	
Probe	PC-39×2
Attenuation	1/10
Input impedance	10 MΩ, 12.5 pF ±10%
Replacement Fuse	1.2 A×2, 0.7 A×2
Instruction Manual	1

* Circuit and rating are subject to change without notice due to developments in technology.

SAFETY

SAFETY

Before connecting the instrument to a power source, carefully read the following information, then verify that the proper power cord is used and the proper line fuse is installed for power source. The specified voltage is shown at the fuse holder of the AC inlet. If the power cord is not applied for specified voltage, there is always a certain amount of danger from electric shock.

Line voltage

This instrument operates using ac-power input voltages that 100/120/220/240 V at frequencies from 50 Hz to 60 Hz.

Power cord

The ground wire of the 3-wire ac power plug places the chassis and housing of the oscilloscope at earth ground. Do not attempt to defeat the ground wire connection or float the oscilloscope; to do so may pose a great safety hazard. The appropriate power cord is supplied by an option that is specified when the instrument is ordered.
The optional power cords are shown as follows in Fig. 1.

Line fuse

The fuse holder is located on the rear panel and contains the line fuse. Verify that the proper fuse is installed by replacing the line fuse.

Voltage conversion

This oscilloscope may be operated from either a 100 V to 240 V, 50/60 Hz power source. Use the following procedure to change from 100 to 240 volt operation or vice versa.

1. Remove the fuse holder.
2. Replace fuse F 1 with a fuse of appropriate value, 1.2 amp for 100 VAC to 120 VAC operation, 0.7 amp for 220 VAC to 240 VAC operation.
3. Reinsert it for appropriate voltage range.
4. When performing the reinsertion of fuse holder for the voltage conversion, the appropriate power cord should be used. (See Fig. 1.)

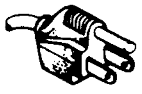
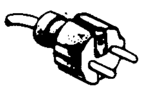
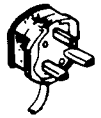
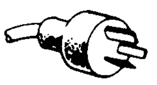
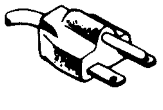
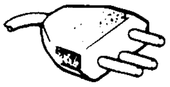
Plug configuration	Power cord and plug type	Factory installed instrument fuse	Line cord plug fuse	Parts No. for power cord and plate
	North American 120 volt/60 Hz Rated 15 amp (12 amp max; NEC)	1.2 A, 250 V Fast blow 6×30 mm	None	Cord: E30-1820-05
	Universal Europe 220 volt/50 Hz Rated 16 amp	North Europe 630 mA, 250 V Slow blow 5×20 mm Other Europe 0.7 A, 250 V Fast blow 6×30 mm	None	Cord: E30-1819-05
	U.K. 240 volt/50 Hz Rated 13 amp	0.7 A, 250 V Fast blow 6×30 mm	0.8 A Type C	–
	Australian 240 volt/50 Hz Rated 10 amp	0.7 A, 250 V Fast blow 6×30 mm	None	Cord: E30-1821-05
	North American 240 volt/60 Hz Rated 15 amp (12 amp max; NEC)	0.7 A, 250 V Fast blow 6×30 mm	None	–
	Switzerland 240 volt/50 Hz Rated 10 amp	0.7 A, 250 V Fast blow 6×30 mm	None	–

Fig. 1 Power Input Voltage Configuration

CIRCUIT DESCRIPTION

VERTICAL PREAMP CIRCUIT (X73-1830-01)

The signal for the input terminal CH1 or Y, CH2 or X is increased to the appropriate value by ATT and sent to the head amplifier Q2-Q5 (CH2: Q102-105). It is then sent to the cascade amplifier U2, Q6, Q7 (CH2: U102, Q106, Q107) through the GAIN switch unit (linked with the ATT) (1/1, 1/2, 1/4 and 1/10).

The feedback of the direct current is applied by the operation amplifier U1 (CH2: U101) to reduce the drift in the head amplifier.

The first cascade amplifier is a gain switch type amplifier. It increases the amplification degree 5X greater than the normal level within a range of 1 mV/div and 2 mV/div.

The signal from the first cascade amplifier is input to the diode gate D2-D5 (CH2: D102-D105 through the 2nd cascade amplifier Q8-Q11 (CH2:Q108-Q113).

The CH1 and CH2 signal is then sent to the delay line driver Q201 and Q202 selected by the V mode switch.

Q112 and Q113 of CH2 are used for current inversion.

TRIGGER SIGNAL CIRCUIT (X73-1830-01)

The signal output by CH1 and CH2 of the cascade amplifier emmitter is sent to the CH1 OUT/CH1 trigger pickoff amplifier Q12-Q15 and CH2 trigger pickoff amplifier Q114 - Q116 for the trigger signal. The signal amplified by CH1 and CH2 in the pickoff amplifier is sent to the H-unit trigger preamplifier by the P5 selected by the switching signal sent from the H-unit through P7.

The signal removed by the collector Q13 in the CH1 trigger pickoff amplifier Q13 passes through the emitter follower Q15 and is output by P1.

VERTICAL FINAL AMPLIFIER (X73-1840-01)

The signal sent through the delay line is terminated and amplified by the second level cascade amplifier Q1-Q9.

The signal that is converted to low impedance in the Q12 and Q13 of the emitter follower is amplified to the appropriate level so it can drive the CRT converter by the final amplifier Q14 - Q15.

POWER SUPPLY CIRCUIT (X73-1830-01)

The power supply contains six stabilized systems and two unstabilized systems. Stabilization is provided for +12 V and −12 V power supplies. +5 V system is stabilized at −12 V. The +55 V and +145 V power supplies are stabilized at a reference voltage of −12 V. The +20 V power supply is stabilized at the #3 pin of U304. The power supply for the scale illumination circuit is ±18 V and the voltage rectified at D301 is sent to the H-unit scale illumination through P10. The +18 V voltage is supplied to the H-unit high-voltage oscillation circuit of the primary side through P10.

CAL CIRCUIT (X73-1830-01)

The oscillation circuit creates a 1-KHz square wave at the multivibrator using the 1/4 and 2/4 of the C-MOSIC U351. It then produces a square waveform at 3/4 and 4/4 of U351 and outputs a 1 Vp-p CAL signal from P9 using resistance separation.

TRIGGER CIRCUIT (X74-1500-01)

The trigger signal from the vertical system is sent from P4 to the source and coupling switches through the Q1 and Q2 signal comparator. It is added to the U1, Q7 and Q8 of the level comparator, which is the differential amplifier for the low impedance signal, by Q5, Q6 of the FET and the U1 emitter follower.

This signal is added to the Schmitt trigger by the buffer amplifier Q13 and Q15 through the slope switch and shaped as a square wave to operate the A and B sweep gate of the sweep circuit and the auto free-run circuit.

Q9 and Q10 are the error detection circuits for the FIX synchronization. The signal is amplified at U2, the mid-range voltage is removed and then the signal is sent to the Schmitt circuit.

Q11, Q12 and Q14 and U3 4/4 are the synchronization signal separation circuits for the television signal. The X-signal for the X-Y operation is obtained from the CH2 trigger pickoff and added to the horizontal amplifier Q202 (X73-1840-01) through the Q19, Q20 and Q21 output circuits.

HORIZONTAL SWEEP CIRCUIT (X74-1500-01)

If the trigger pulse is added to the flip-flop U102 1/2, the output is transfered, and the mirror integration circuit configured at Q104 - Q109 and U103 starts the sweep.

The sweep length for this sweep signal is determined at Q114 and the flip-flop U102 2/2. After a break time determined by Q111, Q112 and Q113 of the hold-off circuit, the trigger signal is obtained again.

The output from the U102 1/2 flip-flop is transfered for the B-sweep after a delay determined by the voltage from the delay pick-off comparator Q213-Q216 and the delay time position.

The sweep signals from both the A-sweep and the B-sweep are switched by the the H-mode switch, U104 and U203 of the horizontal switching circuit and added to the horizontal amplifier Q302.

CIRCUIT DESCRIPTION

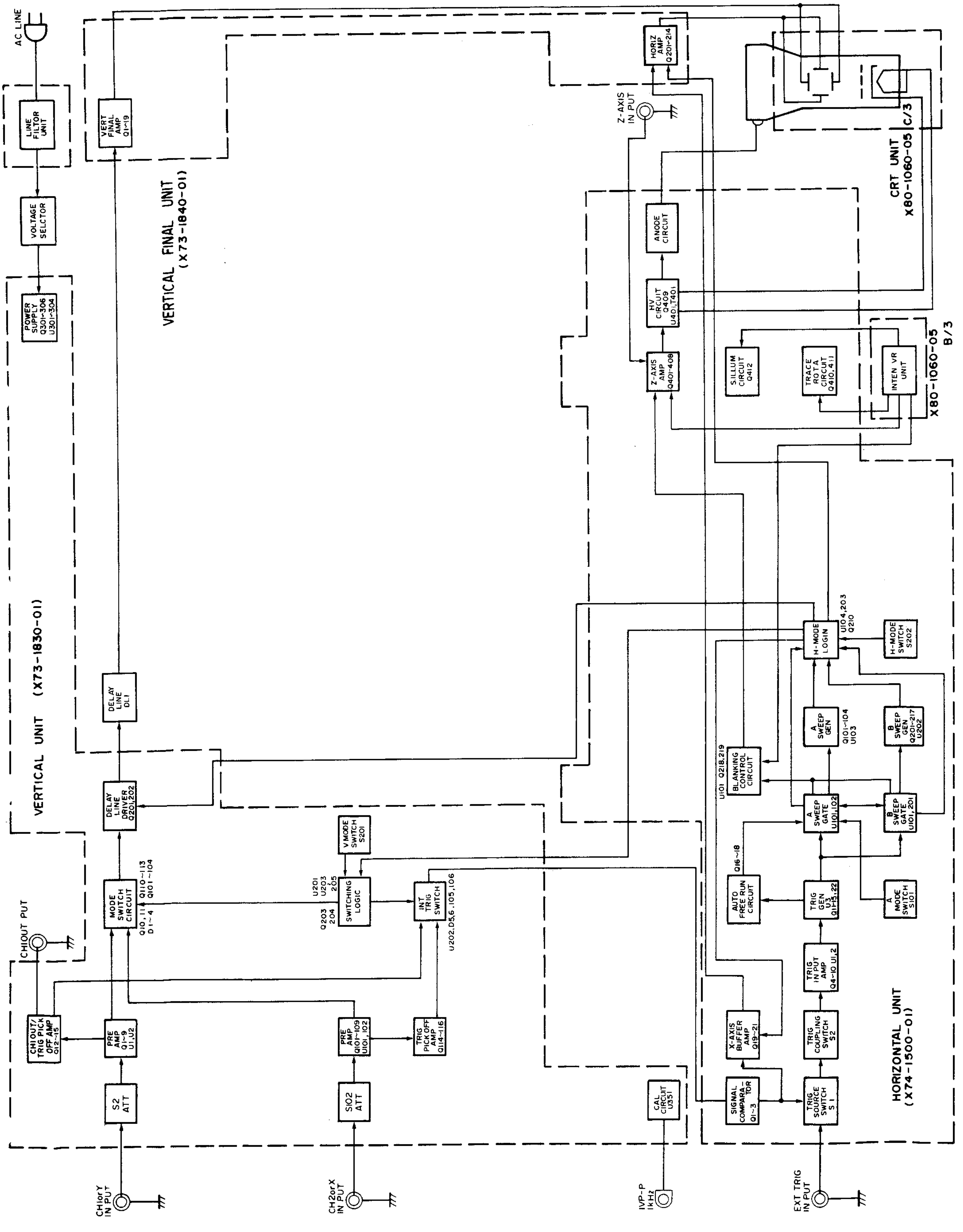
HORIZONTAL AMPLIFIER CIRCUIT (X73-1840-01)

The sweep signal of the sweep circuit is added to Q201 to Q204 of the drive amplifier. The gain X1 and X10 are selected at this time. The power supply amplification signal is switched to the voltage signal at Q205 and Q206 and amplified to an adequate level to drive the CRT deflection board by the high amplification ratio and low output impedance of the final amplifier Q207 to Q214.

TRACE ROTATION AND SCALE ELIMINATION CIRCUITS (X73-1830-01)

The trace rotation circuit drives the rotator coil that is positioned at the CRT cone by the voltage from the common emitter phase correction transistor Q410 and Q411.
The scale elimination circuit performs the optical volume adjustment at Q412.

BLOCK DIAGRAM


AC LINE
X80-1060-05
LINE FILTER UNIT
VOLTAGE SELECTOR
POWER SUPPLY Q301~306 U301~304
VERT FINAL AMP Q1~19
VERTICAL FINAL UNIT (X73-1840-01)
VERTICAL UNIT (X73-1830-01)
DELAY LINE DL1
DELAY LINE DRIVER Q201,202
MODE SWITCH CIRCUIT
Q10, 11 D1~4
Q110~113 Q101~104
CH1OUT PUT
CH1OUT/ TRIG PICK OFF AMP Q12~15
PRE AMP Q1~9 U1,U2
S2 ATT
CH1orY IN PUT
V MODE SWITCH S201
SWITCHING LOGIC
Q203 204
U201 U203 ~ 205
INT TRIG SWITCH
U202,D5,6,105,106
PRE AMP Q101~109 U101, 102
TRIG PICK OFF AMP Q114~116
S102 ATT
CH2orX IN PUT
CAL CIRCUIT U351
1VP-P 1KHz
HORIZ AMP Q201~214
Z-AXIS IN PUT
ANODE CIRCUIT
HV CIRCUIT Q409 U401,T401
Z-AXIS AMP Q401~408
S.ILLUM CIRCUIT Q412
TRACE ROTA CIRCUIT Q410,411
INTEN VR UNIT
X80-1060-05 B/3
CRT UNIT X80-1060-05 C/3
H-MODE LOGIN
U104,203 Q210
H-MODE SWITCH S202
A SWEEP GEN
Q101~104 U103
B SWEEP GEN Q201~217 U202
BLANKING CONTROL CIRCUIT
U101 Q218,219
A SWEEP GATE U101,102
B SWEEP GATE U101, 201
AUTO FREE RUN CIRCUIT
Q16~18
TRIG GEN U3 Q11~15,22
A MODE SWITCH S101
TRIG IN PUT AMP Q4~10 U1,2
X-AXIS BUFFER AMP Q19~21
TRIG COUPLING SWITCH S2
SIGNAL COMPARA-TOR Q1~3
TRIG SOURCE SWITCH S 1
HORIZONTAL UNIT (X74-1500-01)
EXT TRIG IN PUT

ADJUSTMENT

To obtain the best performance, periodically calibrate the unit. Sometimes, only one mode need be calibrated, while at other times, all modes should be calibrated. When one mode is calibrated, it must be noted that the other modes may be affected. When calibrating all modes, perform the calibration in the specified sequence.

The following calibration required an accurate measuring instrument and an insulated adjusting flat blade screwdriver. If they are not available, contact your dealer. For optimum adjustment, turn the power on and warm up the scope sufficiently (more than 30 minutes) before starting.

Before calibrating the scope, check the power supply voltage.

TEST EQUIPMENT REQUIRED

The following instrument or their equivalent should be used for making adjustment.

Test Equipment	Model	Minimum Specification
Digital Multi-Meter	DL-711 (KENWOOD)	Impedance: More than 10 MΩ, Measuring range: 0.01 V to 199 V
Sine-Wave Generator	651 B (YHP)	Frequency: 10 Hz to 10 MHz, constant voltage over tuning range
Sine-Wave Generator	SG-503 (Tektronix)	Frequency: 50 kHz to 100 MHz, Output impedance: 50 Ω, constant voltage over tuning range
Square-Wave Generator	PG-506 (Tektronix)	Output signal: 1 kHz, Amplitude: 10 mVp-p to 10 Vp-p, Accuracy: within ±1%, Rise time: 35ns or less 100 kHz, Rise time: 1 ns or less
Q Meter	4343B (YHP)	–
Color Pattern Generator	CG-911A (KENWOOD)	–
Oscilloscope	475A (Tektronix)	Sensitivity: more than 5 mV Frequency response: More than 250 MHz
Time-Marker Generator	TG-501 (Tektronix)	Time mark: 0.5 s to 0.1μs repetive waveform
High-Voltage Probe	–	Input Impedance: 1000 MΩ
Termination	–	Impedance: 50 Ω Accuracy: within 3%
Termination	–	3 watts type impedance: 50 Ω
Attenuator	–	–20 dB attenuation (50 Ω)

Table 1

PREPARATION FOR ADJUSTMENT

Control Settings

The control settings listed below must be used for each adjustment procedure.

Exceptions to these settings will be noted as they occur.

After completing a adjustment, return the controls to the following settings.

NAME OF KNOBS	POSITION
INTEN	12 o'clock
FOCUS, ASTIG	Optimum position
CH1, CH2 ⬍ POSITION	Mechanical center
CH1, CH2 STORAGE POSI	Mechanical center
◄► POSITION/PULL ×10MAG	Mechanical center, push
VARIABLE, H.VARIABLE (VOLTS/DIV, SWEEP TIME/DIV)	CAL
AC-GND-DC (CH1 and CH2)	DC (GND at no signal)
Vertical MODE	CH1
CH2 PULL INV	Push (NORM)
TRIGGERING COUPLING	AC
TRIGGERING SOURCE	CH1
TRIGGERING LEVEL	Mechanical center, push
TRIGGERING MODE	AUTO
VOLTS/DIV (CH1 and CH2)	5 mV/DIV
A, B SWEEP TIME/DIV	1 ms/DIV
TRACE SEP	Fully CCW
HOLDOFF	Fully CCW, NORM, Push
HORIZONTAL MODE	A
DELAY TIME POSITION	Optimum position

Table 2

ADJUSTMENT

1. POWER SUPPLY AND CRT SECTION ADJUSTMENTS

Item	Adjustment VR (TC)	P.C.B.	Procedure
+12 V	VR301	X73-1830	Adjust VR301 so that the voltage at pin 5 of the connector P14 is +12 V.
CRT Center	VR2	X73-1840	By CH2 posi, locate a point at which luminance line does not move on the PULL and PUSH setting of CH2 INV. Keep CH2 posi as it is, and adjust VR2 to center on the screen.
Vertical Center Voltage	VR5	X73-1840	Adjust VR5 so that the voltage between CRT socket pin "9" and GND is 37 V. * CRT socket pin "9" refers to titanium oxide porcelain capacitor C5.
Focus Center	VR402	X74-1500	Push the FOCUS knob in (for the FOCUS operation) and then set it to the mechanical center position. Pull the knob out (for the ASTIG operation), display a spot on the screen, and adjust the ASTIG control and VR402 to minimize the dimension of the spot.
B Intensity	VR403	X74-1500	Turn fully counterclockwise
Intensity	VR401	X74-1500	Display the spot on the CRT screen, and adjust VR401 so that the spot disappears when the INTEN knob is set to the 10-o'clock position.

2. VERTICAL SECTION ADJUSTMENTS

Item	Adjustment VR (TC)	P.C.B.	Procedure
CH1 Waveform Shaping	TC2 TC4	X73-1830	AC-GND-DC : DC Apply 10 kHz square wave to CH1 INPUT (with the amplitude extending over 4 to 6 div). Set CH1 VOLTS/DIV to 0.1 V range (and 1 V range), and adjust TC2 (and TC4) so that the waveform becomes flat in both ranges.
CH2 Waveform Shaping	TC102 TC104	X73-1830	Adjust in the same way as for CH1.
CH1 Input Capacity	TC1 TC3	X73-1830	AC-GND-DC : DC CH1 VOLTS/DIV : 5 mV Connect the capacity meter to the CH1 INPUT, and measure the input capacity in the 5 mV range. Adjust TC1 and TC3, alternately, so that the input capacity in the 0.1 V and the 1 V ranges equals the same capacity as in the 5 mV range.
CH2 Input Capacity	TC101 TC103	X73-1830	Adjust in the same way as for CH1.
CH1 Step ATT Balance	VR1 VR2	X73-1830	Adjust VR1 so that the position of the luminescent line does not change even when the vertical attenuator is selected between 5 and 10 mV range. Switch the range between 2 and 5 mV ranges, and perform the same adjustment using VR2.
CH1 Variable Balance	VR7	X73-1830	VOLTS/DIV : 5 mV Adjust VR7 so that the position of the luminescent line does not change even if the VARIABLE knob is rotated.

ADJUSTMENT

Item	Adjustment VR (TC)	P.C.B.	Procedure
CH2 Step ATT Balance	VR101 VR102	X73-1830	Adjust in the same way as for CH1.
CH2 Variable Balance	VR107	X73-1830	Adjust in the same way as for CH1.
CH1 Position Center	VR9	X73-1830	CH1 POSITION : Mechanical center position CH1 VOLTS/DIV : 5 mV Adjust VR9 so that the trace is located on the center of the screen.
CH2 Position Center	VR109	X73-1830	Adjust in the same way as for CH1.
ADD position	VR201	X73-1830	Set the channel 1 and channel 2 position controls so that the trace is located on the center of the screen and select the vertical MODE switch to ADD position. Adjust VR201 to center the trace vertically.
CH1 Gain	VR10	X73-1830	CH1 VOLTS/DIV : 10 mV Input a square wave signal having an amplitude of 50 mV, and adjust VR10 so that the CRT amplitude becomes 5 div.
CH1 1 mV Gain	VR4	X73-1830	CH1 VOLTS/DIV : 1 mV Input a square wave signal having an amplitude of 5 mV, and adjust VR4 so that the CRT amplitude becomes 5 div.
CH2 Gain	VR110	X73-1830	Adjust in the same way as for CH1.
CH2 1 mV Gain	VR104	X73-1830	Adjust in the same way as for CH1.
X Gain	VR3	X74-1500	CH2 VOLTS/DIV : 10 mV HORIZONTAL MODE : X-Y Input the square wave signal having an amplitude of 50 mV into CH2 INPUT, and adjust VR3 so that the CRT amplitude in the horizontal direction becomes 5 div.
TRIG. SLOPE	VR2	X74-1500	TRIGGERING MODE : AUTO TRIGGERING SOURCE : CH1 TRIGGERING COUPLING : AC CH1 VOLTS/DIV : 5 mV Input a sinewave signal of 1 KHz frequency and 6 DIV amplitude into CH1 INPUT. Sychronize by TRIG. LEVEL knob Change the TRIG. SLOP from "+" to "–", and adjust by VR2 knob so that the start point becomes same as the "+".

ADJUSTMENT

3. TRIGGER SECTION ADJUSTMENTS

Item	Adjustment VR (TC)	P.C.B.	Procedure
Trigger Level Center	VR1	X74-1500	TRIGGERING MODE : AUTO SOURCE : CH1 COUPLING : AC LEVEL : Mechanical center position SLOPE : + Input a 1 kHz sine wave into CH1 INPUT, and adjust the oscillator so that the CRT amplitude becomes 6 div. Adjust VR1 so that start point of the luminescent line is at the center of the CRT (vertical direction).
CH1 Trigger DC Coupling	VR11	X73-1830	After adjusting the trigger level center, set the TRIGGERING COUPLING to the DC position. Adjust VR11 so that the start point of the luminescent line is at the same position as in the AC mode.
CH2 Trigger DC Coupling	VR111	X73-1830	TRIGGERING MODE : AUTO SOURCE : CH2 COUPLING : AC CH2 VOLTS/DIV : 5 mV Input a 1 kHz sine wave to CH2 INPUT, and adjust the oscillator so that the CRT amplitude becomes 6 div. Adjust the TRIGGERING LEVEL so that the start point of the luminescent line is at the center of the CRT. Set the TRIGGERING COUPLING to the DC position. Adjust VR111 so that the start point of the luminescent line is at the same position as in the AC mode.

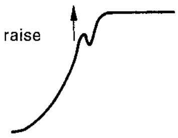
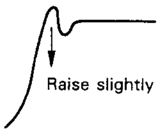
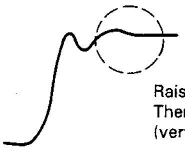
4. HORIZONTAL SECTION ADJUSTMENTS

Item	Adjustment VR (TC)	P.C.B.	Procedure
B Sweep Start Point	VR204	X74-1500	HORIZONTAL MODE : ALT A and B SWEEP TIME/DIV: 1 ms Adjust VR204 to coinside the start point of B sweep with that of A sweep.
1 ms Range Sweep Time	VR101 VR201	X74-1500	SWEEP TIME/DIV : 1 ms Input a 1 ms marker signal into CH1 INPUT. Adjust VR101 and VR201 so that the peak of the marker signal matches the CRT scale divided in 1 div.
1 μs Range Sweep Time	TC101 TC201	X74-1500	SWEEP TIME/DIV : 1 μs Input a 1 μs marker signal into CH1 INPUT, and adjust in the same way as for 1 ms adjustment.
× 10 MAG Gain	VR202	X74-1840	HORIZONTAL MODE : A A SWEEP TIME/DIV : 1 ms Input a 1 ms marker signal into CH1 INPUT, and match the peak of the marker signal with the CRT scale divided in 1 div. Pull the PULL × 10 MAG knob (to set to the × 10 MAG status), and adjust VR202 so that the interval between peaks becomes 10 div.
× 10 MAG Center	VR201	X74-1840	A SWEEP TIME/DIV : 1 ms Input a 5 ms marker signal into CH1 INPUT. Pull the PULL × 10 MAG knob (to set to the × 10 MAG status), and adjust the horizontal POSITION so that the peak of the waveform is at the vertical scale line at the center of the CRT. Push the PULL × 10 MAG knob (to release the × 10 MAG mode) and adjust VR201 so that the peak of the waveform matches the vertical scale line at the center of the CRT.

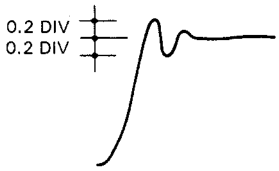
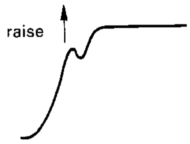
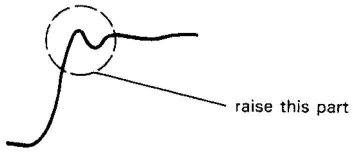
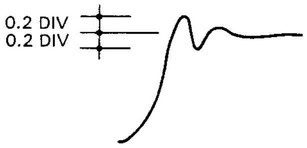
ADJUSTMENT

Item	Adjustment VR (TC)	P.C.B.	Procedure
Delay Time Position	VR203 VR202	X74-1500	HORIZONTAL MODE : ALT A SWEEP TIME/DIV : 0.1 ms B SWEEP TIME/DIV : 1 μs Turn the DELAY TIME POSITION knob until you have [DELAY 0.030 ms] on the screen. Adjust to 0.3 DIV by VR203 knob. Then, turn the DELAY TIME POSITION knob to have [DELAY 0.980 ms] on the screen. Adjust to 9.8 DIV by VR203 knob. * Repeat for any other values.
X Position Center	VR4	X74-1500	Adjust the horizontal POSITION knob so that the sweep start point moves to the vertical scale line at the left end of CRT. Switch to the X-Y mode and adjust VR4 to bring the spot to the center of CRT screen.

5. OVERSHOOT AND CAL ADJUSTMENTS

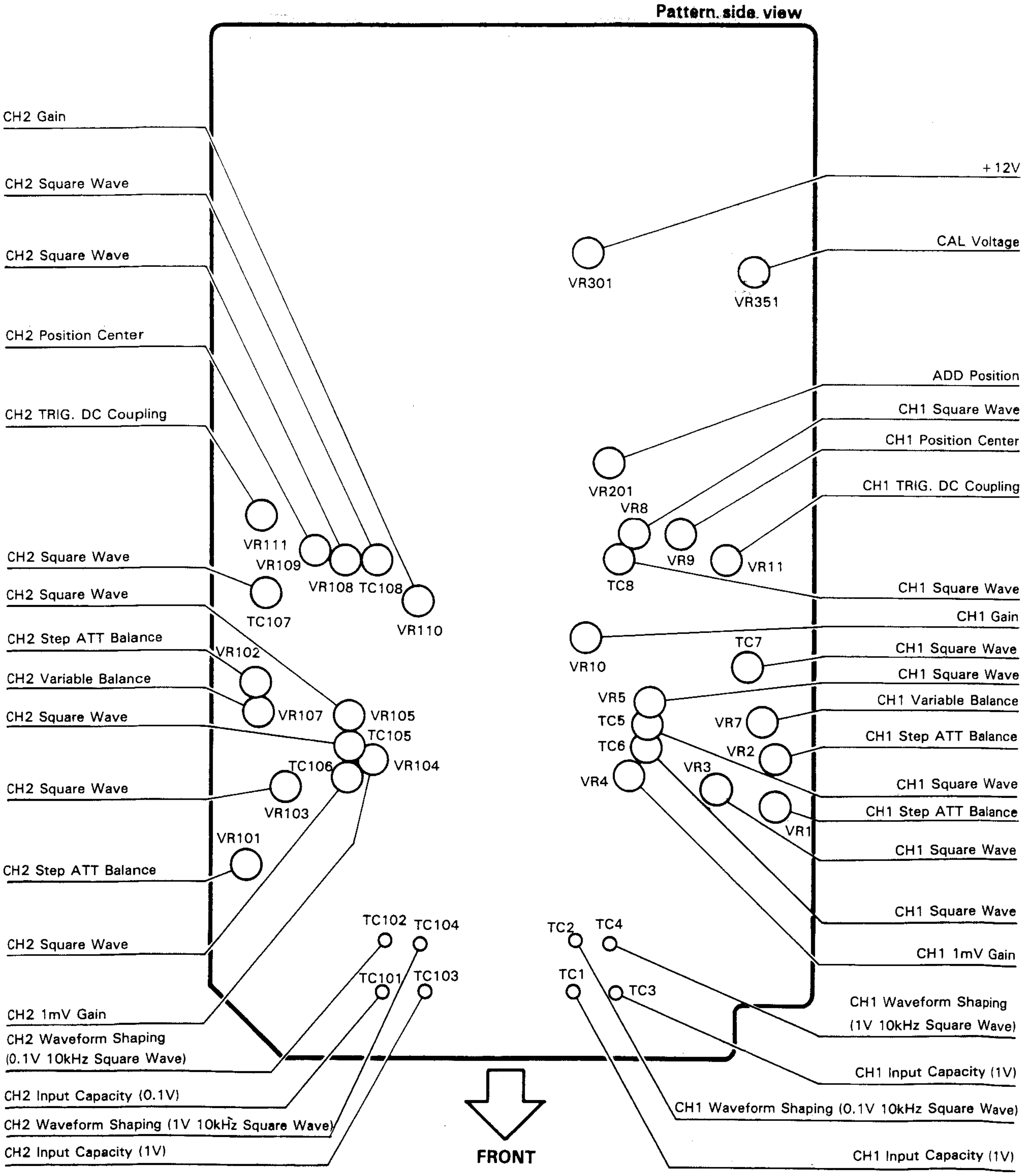
Item	Adjustment VR (TC)	P.C.B.	Procedure
Overshoot Adjustment	<For CH1> VR8 TC8 TC7 VR5 TC5 VR3 TC6 <For CH2> TC108 VR108 TC107 VR105 TC105 VR103 TC106	X73-1830	CH1, 2 VOLTS/DIV : 5 mV CH1, 2 AC-GND-DC : DC SWEEP TIME/DIV : 0.2 μs Input a square wave signal of 1 MHz frequency and 6 DIV amplitude into CH1 INPUT. Turn the VOLUME knob fully clockwise. VR6 (final unit) VR3, 103 (vertical unit) Turn the VOLUME knob fully counterclockwise. VR1 (final unit) Turn the VOLUME knob halfway. VR8 (vertical unit) Obtain as high as possible overshoot by TC4 (final unit)  ● Obtain as high as possible overshoot by TC7 (vertical unit) (when using X10MAG. The wave distortion becomes minimum) ● Obtain as low as possible overshoot by TC1 (final unit) (when using X10MAG)  Raise slightly after lowering. Set the SWEEP TIME/DIV on 0.05 μs ● Flatten the middle part by TC8 (vertical unit)  Raise slightly by VR8 (vertical unit). Then flatten the following part by TC8 (vertical unit).
	TC4 VR6 TC3 TC1 VR1	X73-1840	

ADJUSTMENT

Item	Adjustment VR (TC)	P.C.B.	Procedure
			● Get an overshoot by TC5, 6 (vertical unit) Also try to turn VR5 and TC8 slightly.  Input a square wave signal of 1 MHz frequency and 6 div amplitude into CH2 INPUT. ● Obtain as high as possible overshoot by TC107 (vertical unit)  ● Raise the wave as high as possible by TC108 (vertical unit)  ● Use VR108 (vertical unit) to flatten the part which is moved by TC108. ● Get an overshoot by TC105, 106, VR105 (vertical unit)  If this value is not within the specification, then, adjust with both TC108 and VR108.
CAL Adjustment	VR351	X73-1830	Connect the oscilloscope to the CAL terminal and set it to 0.2 V/div. Adjust VR351 so that the amplitude is of 5 divisions for 40 MHz input.

ADJUSTMENT

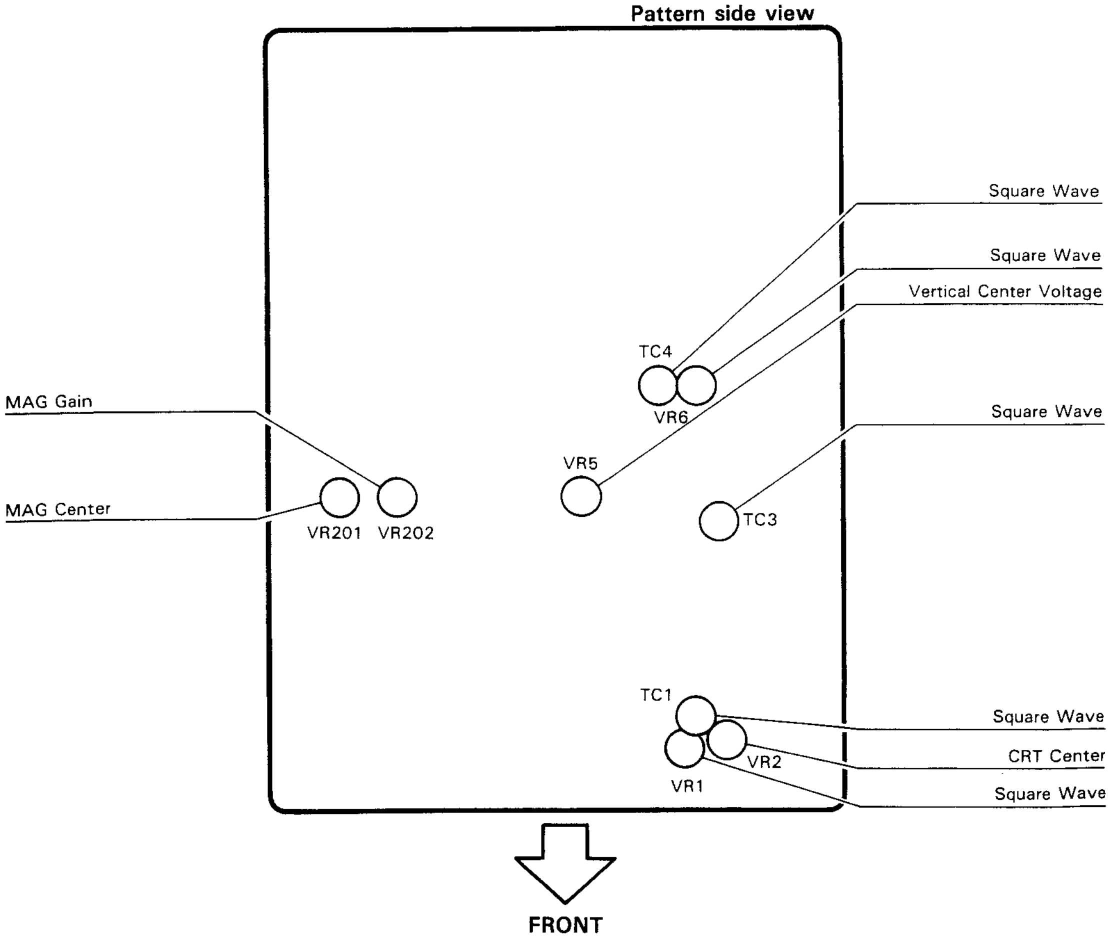
VERTICAL UNIT (X73-1830-01)



Pattern side view
CH2 Gain
CH2 Square Wave
CH2 Square Wave
CH2 Position Center
CH2 TRIG. DC Coupling
CH2 Square Wave
CH2 Square Wave
CH2 Step ATT Balance
CH2 Variable Balance
CH2 Square Wave
CH2 Square Wave
CH2 Step ATT Balance
CH2 Square Wave
CH2 1mV Gain
CH2 Waveform Shaping (0.1V 10kHz Square Wave)
CH2 Input Capacity (0.1V)
CH2 Waveform Shaping (1V 10kHz Square Wave)
CH2 Input Capacity (1V)
VR111
VR109
VR108
TC108
VR110
TC107
VR102
VR107
VR105
TC105
TC106
VR104
VR103
VR101
TC102
TC104
TC101
TC103
FRONT
+12V
CAL Voltage
VR301
VR351
ADD Position
CH1 Square Wave
CH1 Position Center
CH1 TRIG. DC Coupling
VR201
VR8
VR9
VR11
TC8
CH1 Square Wave
CH1 Gain
VR10
TC7
CH1 Square Wave
CH1 Square Wave
CH1 Variable Balance
VR5
TC5
TC6
VR4
VR7
VR2
VR3
VR1
CH1 Step ATT Balance
CH1 Square Wave
CH1 Step ATT Balance
CH1 Square Wave
CH1 Square Wave
CH1 1mV Gain
TC2
TC4
TC1
TC3
CH1 Waveform Shaping (1V 10kHz Square Wave)
CH1 Input Capacity (1V)
CH1 Waveform Shaping (0.1V 10kHz Square Wave)
CH1 Input Capacity (1V)

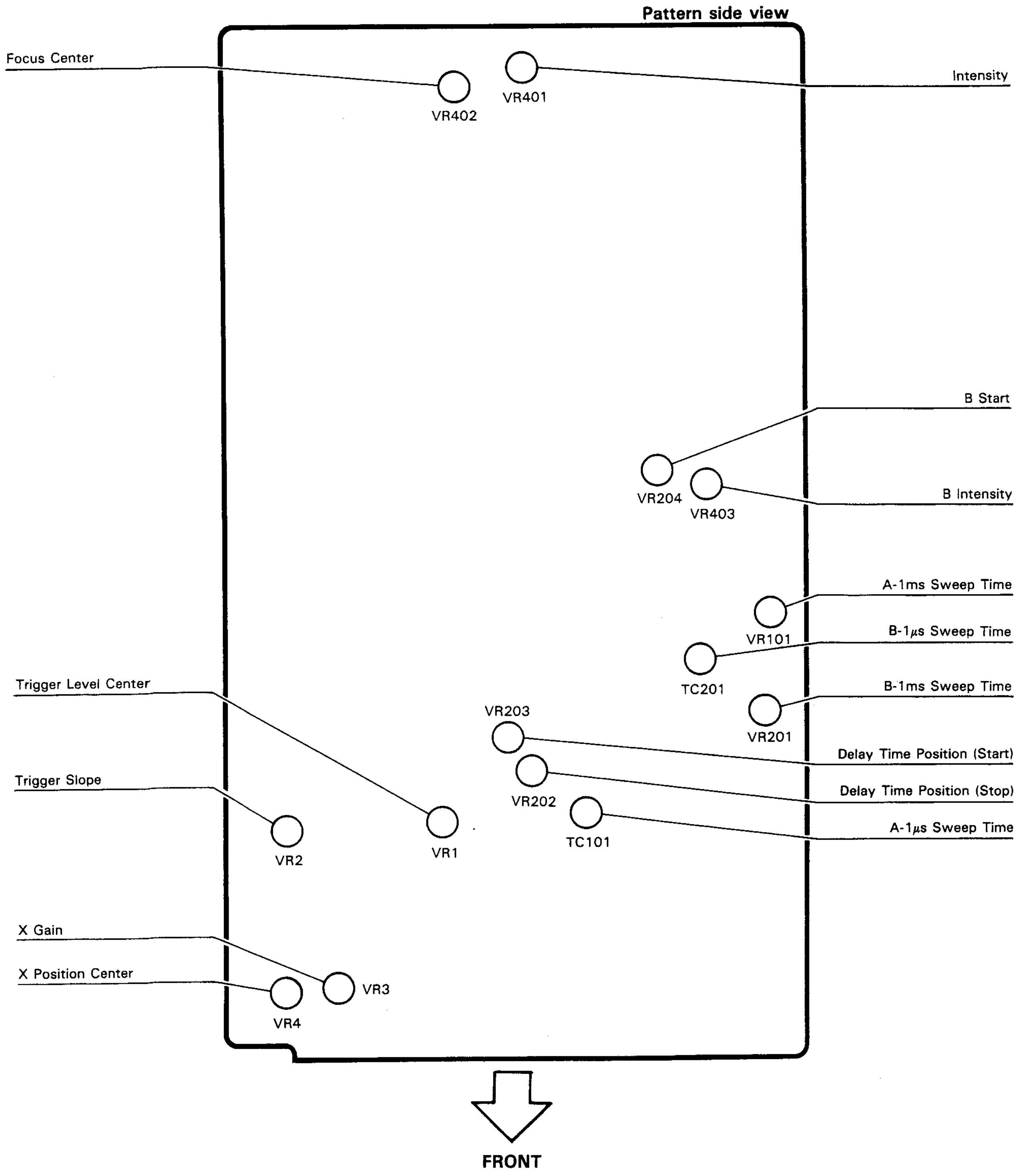
ADJUSTMENT

VERTICAL FINAL UNIT (X73-1840-01)

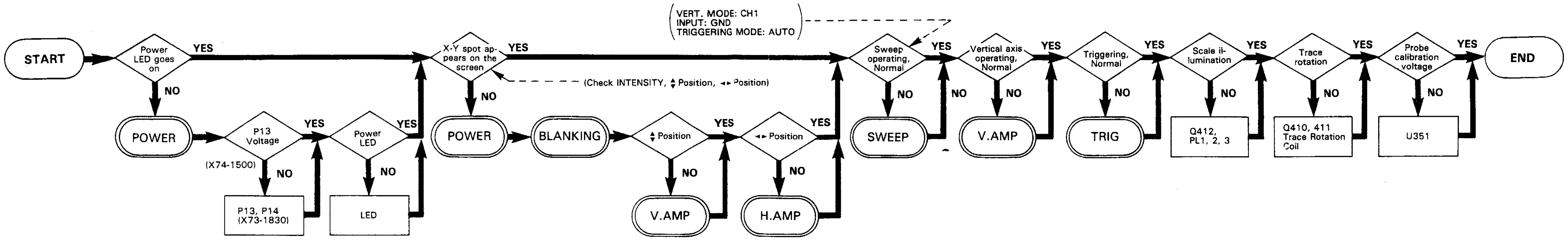

Pattern side view
Square Wave
Square Wave
Vertical Center Voltage
TC4
VR6
Square Wave
MAG Gain
VR5
MAG Center
VR201
VR202
TC3
TC1
Square Wave
VR2
CRT Center
VR1
Square Wave
FRONT

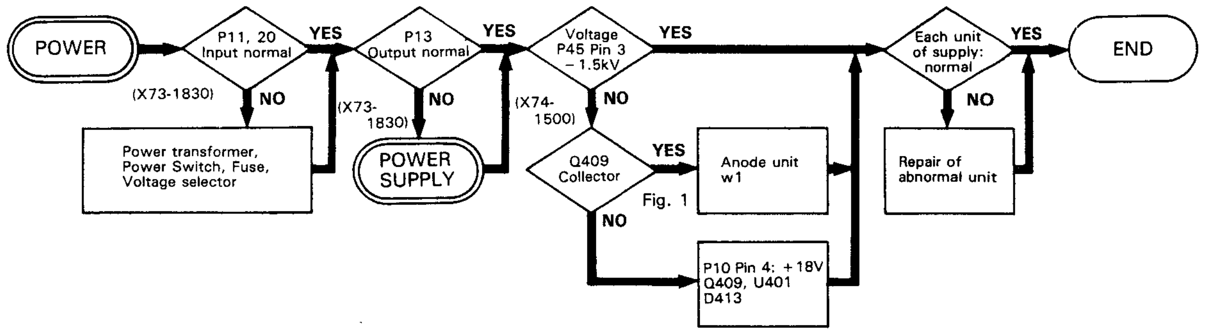
ADJUSTMENT

HORIZONTAL UNIT (X74-1500-01)


Pattern side view
Focus Center
VR402
VR401
Intensity
B Start
VR204
VR403
B Intensity
A-1ms Sweep Time
VR101
B-1μs Sweep Time
TC201
Trigger Level Center
B-1ms Sweep Time
VR203
VR201
Delay Time Position (Start)
Trigger Slope
Delay Time Position (Stop)
VR202
A-1μs Sweep Time
TC101
VR2
VR1
X Gain
X Position Center
VR3
VR4
FRONT

TROUBLESHOOTING


START
Power LED goes on
YES
NO
POWER
P13 Voltage
(X74-1500)
YES
NO
P13, P14 (X73-1830)
Power LED
YES
NO
LED
X-Y spot appears on the screen
YES
NO
(Check INTENSITY, ↕ Position, ◄► Position)
POWER
BLANKING
↕ Position
YES
NO
V.AMP
◄► Position
YES
NO
H.AMP
VERT. MODE: CH1
INPUT: GND
TRIGGERING MODE: AUTO
Sweep operating, Normal
YES
NO
SWEEP
Vertical axis operating, Normal
YES
NO
V.AMP
Triggering, Normal
YES
NO
TRIG
Scale illumination
YES
NO
Q412, PL1, 2, 3
Trace rotation
YES
NO
Q410, 411 Trace Rotation Coil
Probe calibration voltage
YES
NO
U351
END


POWER
P11, 20 Input normal
(X73-1830)
YES
NO
Power transformer, Power Switch, Fuse, Voltage selector
P13 Output normal
(X73-1830)
YES
NO
POWER SUPPLY
Voltage P45 Pin 3 −1.5kV
(X74-1500)
YES
NO
Q409 Collector
Fig. 1
YES
NO
Anode unit w1
P10 Pin 4: +18V
Q409, U401
D413
Each unit of supply: normal
YES
NO
Repair of abnormal unit
END

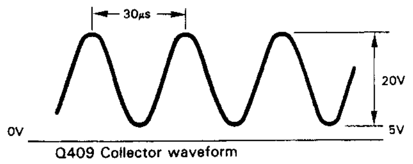
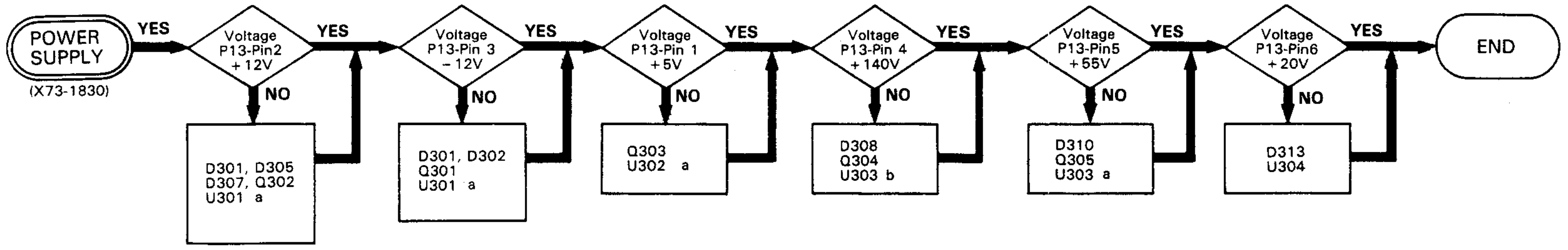
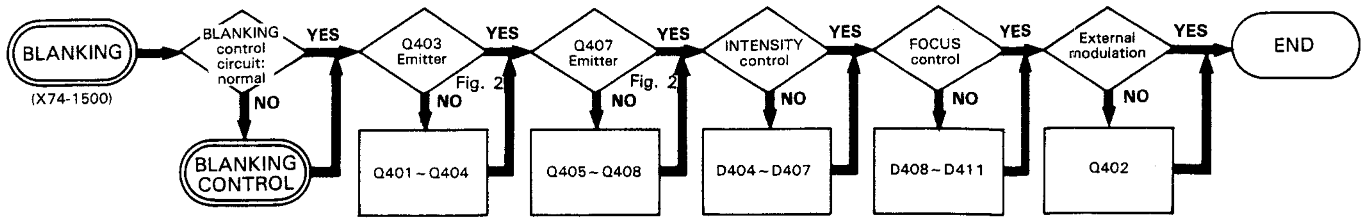


Fig. 1


POWER SUPPLY
(X73-1830)
YES
Voltage P13-Pin2 +12V
YES
NO
D301, D305
D307, Q302
U301 a
Voltage P13-Pin 3 −12V
YES
NO
D301, D302
Q301
U301 a
Voltage P13-Pin 1 +5V
YES
NO
Q303
U302 a
Voltage P13-Pin 4 +140V
YES
NO
D308
Q304
U303 b
Voltage P13-Pin5 +55V
YES
NO
D310
Q305
U303 a
Voltage P13-Pin6 +20V
YES
NO
D313
U304
END


BLANKING
(X74-1500)
BLANKING control circuit: normal
YES
NO
BLANKING CONTROL
Q403 Emitter
Fig. 2
YES
NO
Q401～Q404
Q407 Emitter
Fig. 2
YES
NO
Q405～Q408
INTENSITY control
YES
NO
D404～D407
FOCUS control
YES
NO
D408～D411
External modulation
YES
NO
Q402
END

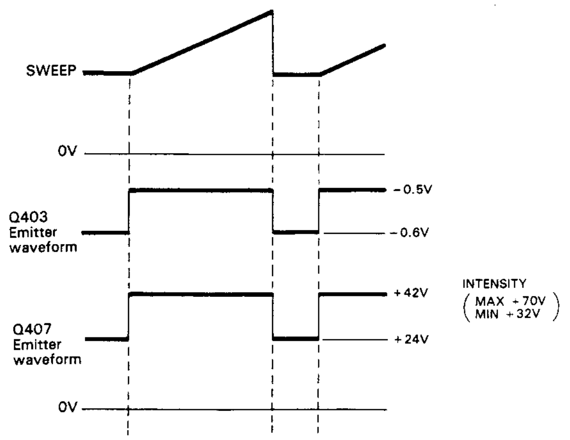
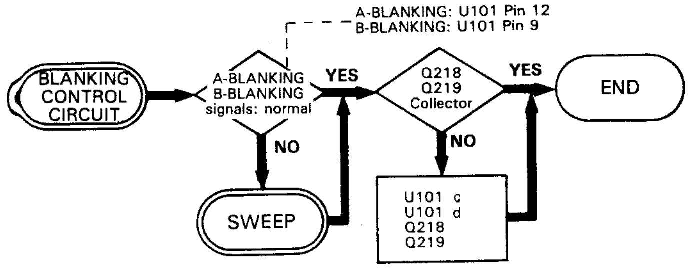
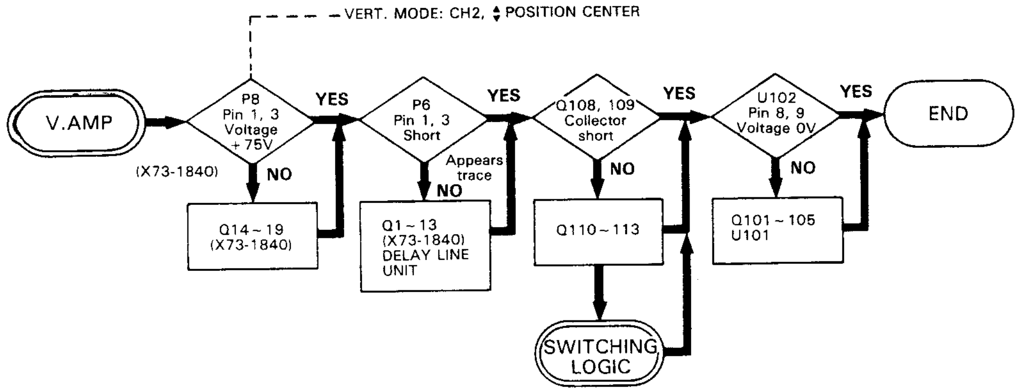
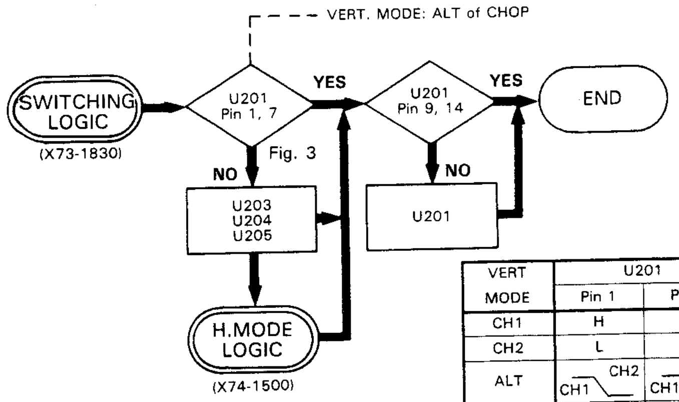


Fig. 2

TROUBLESHOOTING

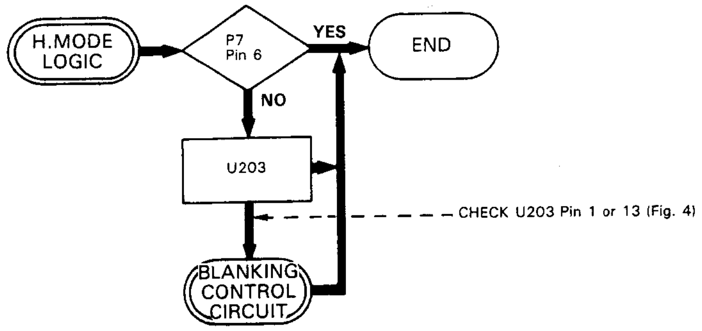

A-BLANKING: U101 Pin 12
B-BLANKING: U101 Pin 9
BLANKING CONTROL CIRCUIT
A-BLANKING B-BLANKING signals: normal
YES
NO
SWEEP
Q218 Q219 Collector
YES
NO
U101 c
U101 d
Q218
Q219
END


VERT. MODE: CH2, ⇕ POSITION CENTER
V.AMP
(X73-1840)
P8 Pin 1, 3 Voltage +75V
YES
NO
Q14 ~ 19 (X73-1840)
P6 Pin 1, 3 Short
Appears trace
YES
NO
Q1 ~ 13 (X73-1840) DELAY LINE UNIT
Q108, 109 Collector short
YES
NO
Q110 ~ 113
SWITCHING LOGIC
U102 Pin 8, 9 Voltage 0V
YES
NO
Q101 ~ 105
U101
END


VERT. MODE: ALT of CHOP
SWITCHING LOGIC
(X73-1830)
U201 Pin 1, 7
Fig. 3
YES
NO
U203
U204
U205
H.MODE LOGIC
(X74-1500)
U201 Pin 9, 14
YES
NO
U201
END

VERT MODE	U201	
	Pin 1	Pin 7
CH1	H	H
CH2	L	L
ALT	CH1 ⎺╲⎽ CH2	CH1 ⎺╲⎽ CH2
CHOD	CH1 ⎺╲⎽ CH2	CH1 ⎺╲⎽ CH2
ADD	L	H

Fig. 3


H.MODE LOGIC
P7 Pin 6
YES
NO
END
U203
CHECK U203 Pin 1 or 13 (Fig. 4)
BLANKING CONTROL CIRCUIT

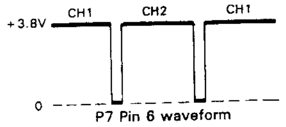
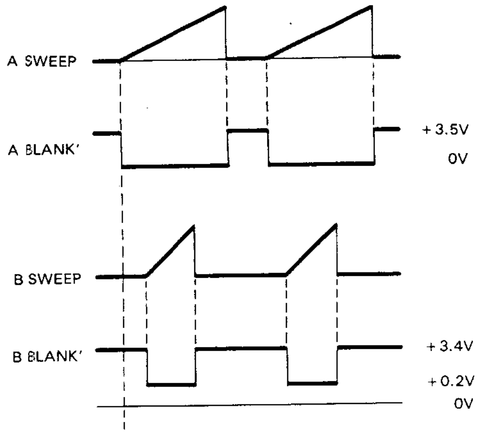
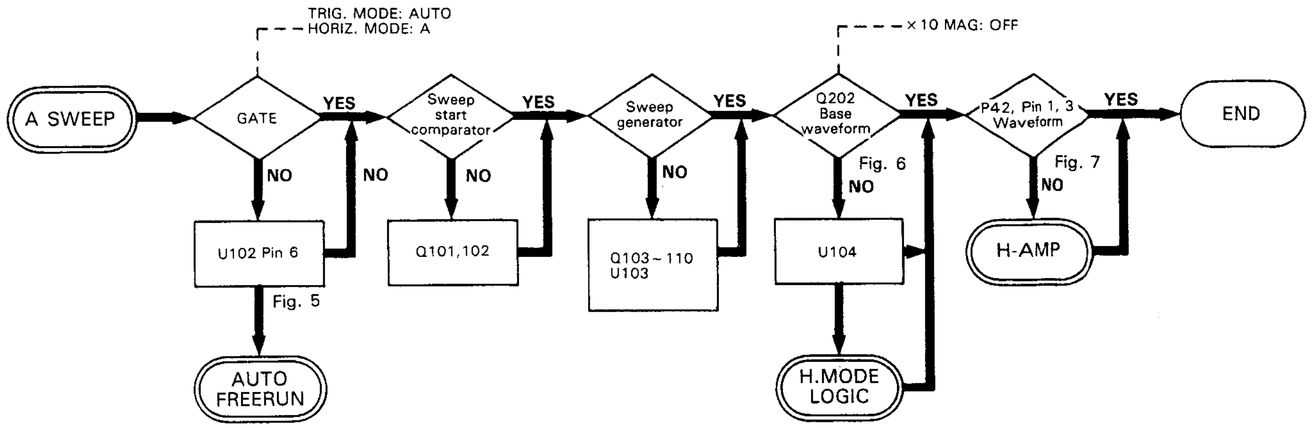

+3.8V
CH1
CH2
CH1
0
P7 Pin 6 waveform

Fig. 4


A SWEEP
A BLANK'
+3.5V
0V
B SWEEP
B BLANK'
+3.4V
+0.2V
0V

TROUBLESHOOTING


TRIG. MODE: AUTO
HORIZ. MODE: A
A SWEEP
GATE
YES
NO
U102 Pin 6
Fig. 5
AUTO FREERUN
Sweep start comparator
Q101,102
Sweep generator
Q103~110 U103
×10 MAG: OFF
Q202 Base waveform
Fig. 6
U104
H.MODE LOGIC
P42, Pin 1, 3 Waveform
Fig. 7
H-AMP
END

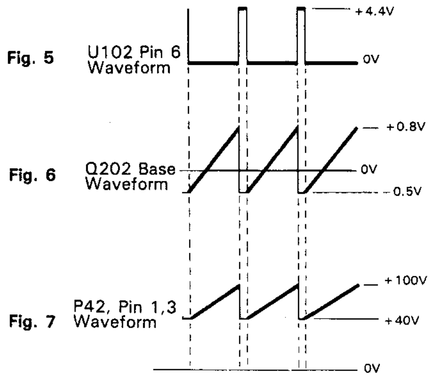
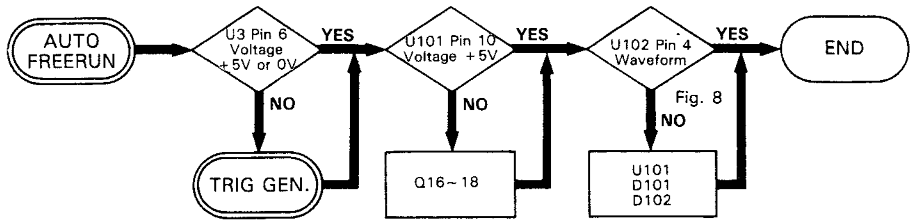


Fig. 5
U102 Pin 6 Waveform
+4.4V
0V
Fig. 6
Q202 Base Waveform
+0.8V
0V
-0.5V
Fig. 7
P42, Pin 1,3 Waveform
+100V
+40V
0V


AUTO FREERUN
U3 Pin 6 Voltage +5V or 0V
YES
NO
TRIG GEN.
U101 Pin 10 Voltage +5V
Q16~18
U102 Pin 4 Waveform
Fig. 8
U101 D101 D102
END

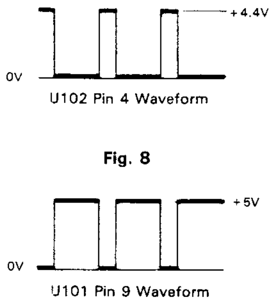

+4.4V
0V
U102 Pin 4 Waveform
+5V
0V
U101 Pin 9 Waveform

Fig. 8

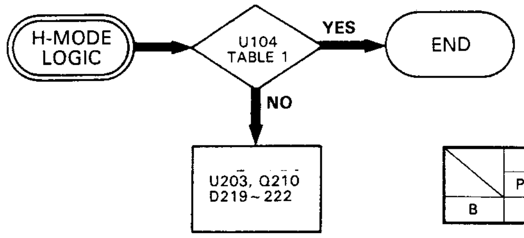
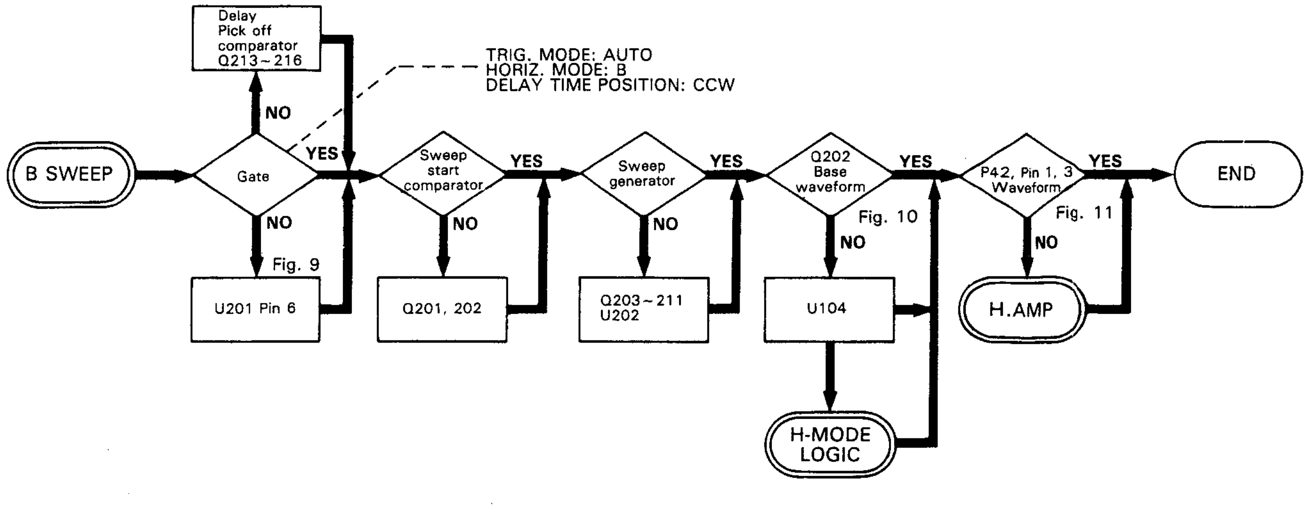

H-MODE LOGIC
U104 TABLE 1
YES
NO
END
U203, Q210 D219~222

TABLE 1

	U104			
	Pin 9	Pin 10	Pin 11	Pin 15
B	H	L	H	H


Delay Pick off comparator Q213~216
TRIG. MODE: AUTO
HORIZ. MODE: B
DELAY TIME POSITION: CCW
B SWEEP
Gate
YES
NO
Fig. 9
U201 Pin 6
Sweep start comparator
Q201, 202
Sweep generator
Q203~211 U202
Q202 Base waveform
Fig. 10
U104
H-MODE LOGIC
P42, Pin 1, 3 Waveform
Fig. 11
H.AMP
END

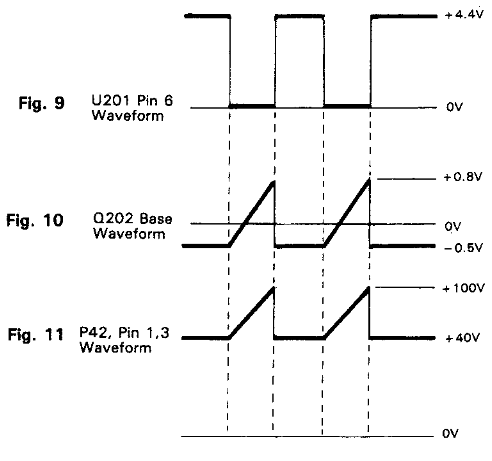


Fig. 9
U201 Pin 6 Waveform
+4.4V
0V
Fig. 10
Q202 Base Waveform
+0.8V
0V
-0.5V
Fig. 11
P42, Pin 1,3 Waveform
+100V
+40V
0V

TROUBLESHOOTING

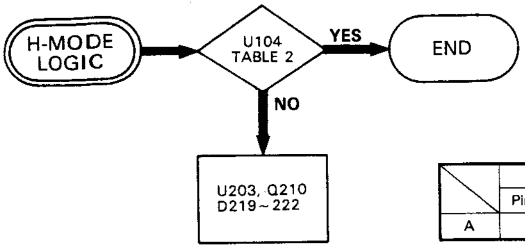
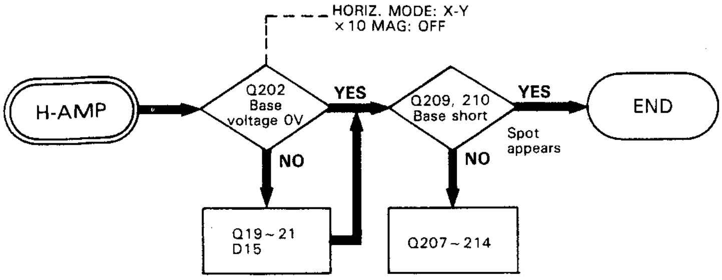

H-MODE LOGIC
U104 TABLE 2
YES
END
NO
U203, Q210 D219~222

TABLE 2

	U104			
	Pin 9	Pin 10	Pin 11	Pin 15
A	H	H	L	L


HORIZ. MODE: X-Y
×10 MAG: OFF
H-AMP
Q202 Base voltage 0V
YES
NO
Q19~21 D15
Q209, 210 Base short
YES
NO
Spot appears
Q207~214
END

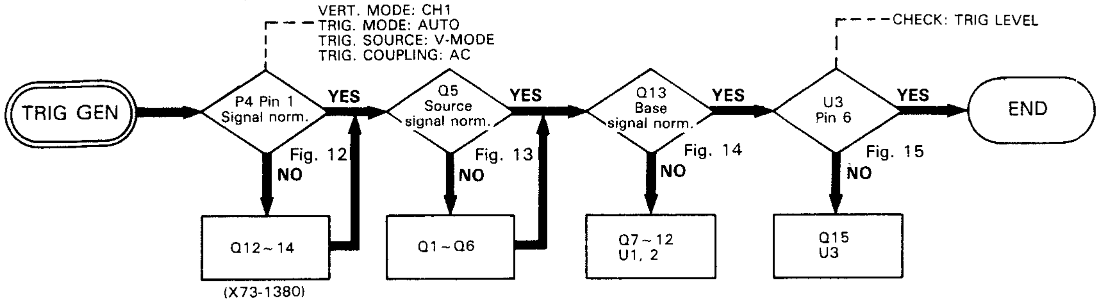

VERT. MODE: CH1
TRIG. MODE: AUTO
TRIG. SOURCE: V-MODE
TRIG. COUPLING: AC
CHECK: TRIG LEVEL
TRIG GEN
P4 Pin 1 Signal norm.
YES
Fig. 12
NO
Q12~14
(X73-1380)
Q5 Source signal norm.
YES
Fig. 13
NO
Q1~Q6
Q13 Base signal norm.
YES
Fig. 14
NO
Q7~12 U1, 2
U3 Pin 6
YES
Fig. 15
NO
Q15 U3
END

Fig. 12

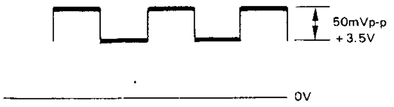

50mVp-p
+3.5V
0V

Fig. 13

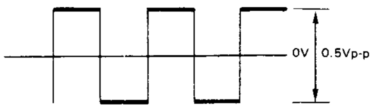


Fig. 14

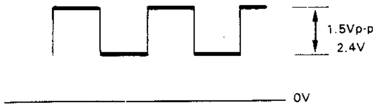
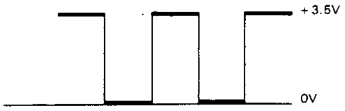

1.5Vp-p
2.4V
0V

Fig. 15



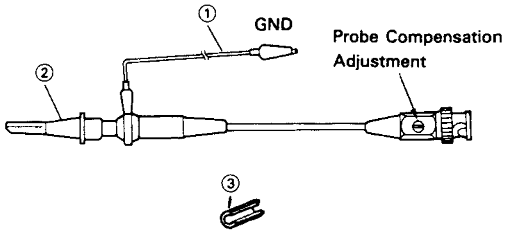
PARTS LIST

CS-5175 UNIT

(Y70-1690-00)

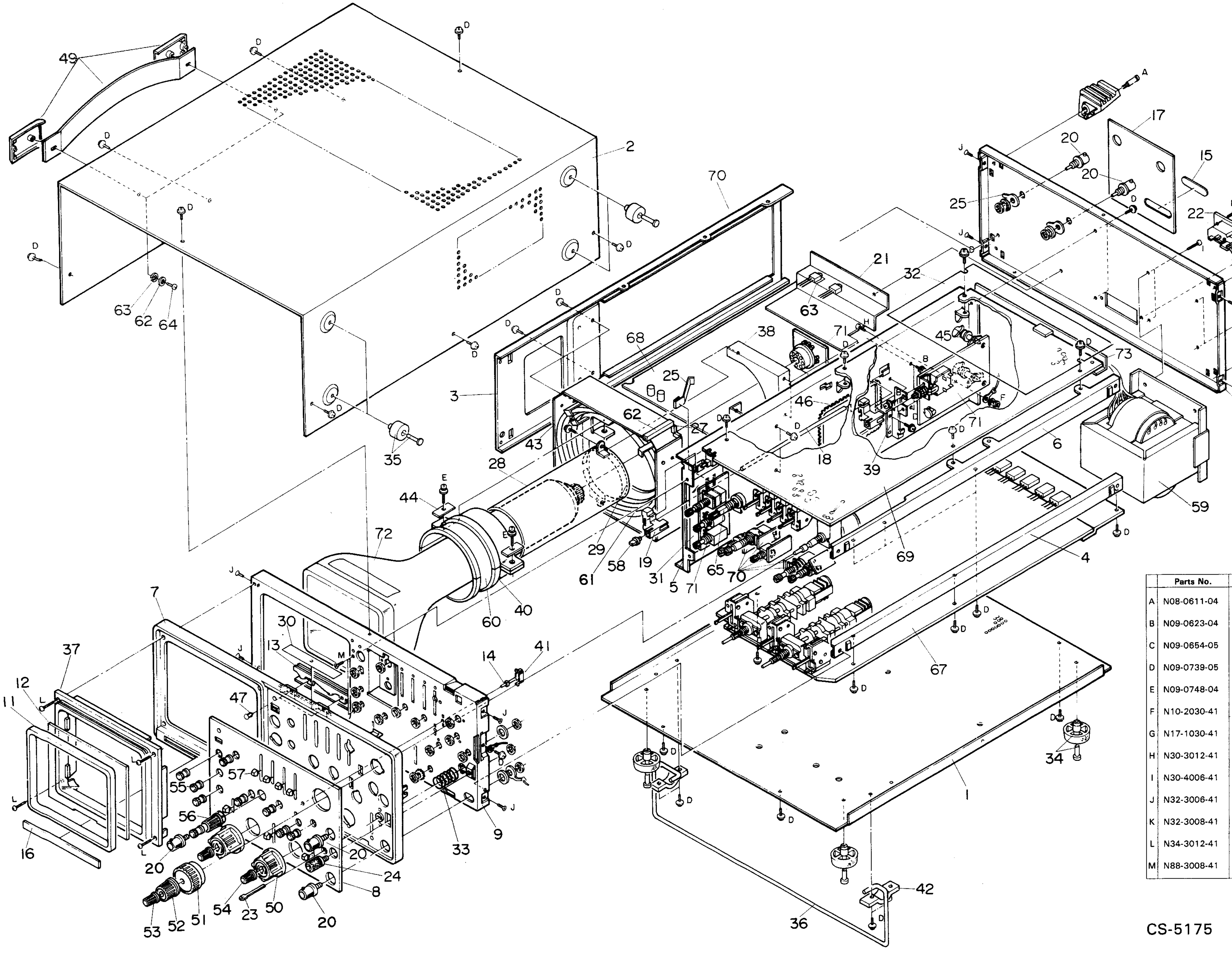
REF.NO	PARTS NO	NAME & DESCRIPTION
	B30-0952-05	LAMP (T4.2 8V 0.15A)
	B41-0710-04	CAUTION LABEL (HIGH VOLTAGE)
	B50-7687-10	INSTRUCTION MANUAL, JAPANESE
	B50-7688-10	INSTRUCTION MANUAL, ENGLISH
	CC45CH1H470J	CAP. CERAMIC 47P 5% 50V
	E23-0018-04	EARTH LUG
	E23-0513-05	EARTH LUG,BNC
	E31-0564-05	WIRE ASS'Y(GND GREEN)
	E31-2861-05	WIRE ASS'Y (INLET-FILTER P69)
	E31-5502-05	WIRE ASS'Y(CH1 OUT P1)
	E31-5526-05	WIRE ASS'Y(Z AXIS P45)
	E31-5678-05	WIRE ASS'Y(EXT P23)
	E31-5679-05	WIRE ASS'Y(CAL P9)
	E31-5680-05	WIRE ASS'Y(P26)
	E31-5681-05	WIRE ASS'Y(GND P63)
	E31-5685-05	WIRE ASS'Y(P56)
	E31-5686-05	WIRE ASS'Y(P60)
	E31-5691-05	WIRE ASS'Y (BNC X 2)
	E31-5696-05	WIRE ASS'Y(P4)
	E38-0012-05	WIRE ASS'Y
	E38-0053-05	WIRE ASS'Y(P65)
	F05-1224-05	FUSE 1.2A(6X30MM) FOR 100/120V
	F05-6313-05	FUSE(5X20MM) 0.63AT
	F05-7011-05	FUSE 0.7A(6X30MM) FOR 220/240V
	F15-0753-04	FELT
	H10-2828-12	FOAMED STYRENE PAD (FRONT)
	H10-2829-12	FOAMED STYRENE PAD (REAR)
	H20-1727-04	VINYL COVER
	H25-0029-04	POLYETHYLENE BAG (FUSE)
	H53-0002-04	CARTON BOX
	J19-1620-05	CORD KEEP
	J30-0623-04	SPACER
	J61-0408-05	WIRE WRAPPING BAND
	J61-0509-05	WIRE WRAPPING BAND
	N19-0191-05	WASHER NONMETAL
	RD14BB2C470J	RES. CARBON 47 5% 1/6W
	RD14BB2E101J	RES. CARBON 100 5% 1/4W
	W03-2305-15	PROBE (PC-39)
C1	CC45CH1H101J	CAP. CERAMIC 100P 5% 50V
C2	CC45CH1H101J	CAP. CERAMIC 100P 5% 50V
Q302	2SB834(Y)	TR. SI, PNP
Q305	2SA1668	TR. SI, PNP
R1	RD14BB2E220J	RES. CARBON 22 5% 1/4W
R2	RD14BB2E220J	RES. CARBON 22 5% 1/4W
1	A01-1154-22	CASE(BOTTOM)
2	A01-1193-02	CASE(TOP)
3	A13-0914-02	FRAME (L)
4	A13-0917-02	FRAME (R.LOWER)
5	A13-0922-22	FRAME (CENTER)
6	A13-0923-02	FRAME(R.UPPER)
7	A20-2822-21	MOLDED PANEL
8	A21-1168-03	DECORATIVE PANEL
9	A22-0870-02	SUB PANEL
10	A23-1682-02	REAR PANEL
11	B07-0716-03	FILTER FRAME
12	B19-0749-04	FILTER
13	B30-0951-25	SCALE ILLUMI LAMP ASS'Y
14	B30-0957-05	LED (LN322GPT)
15	B40-2765-04	NAME PLATE (SERIAL NO)
16	B40-2933-03	NAME PLATE (MODEL)
17	B41-0871-04	
18	D21-0915-04	EXTENSION SHAFT
19	D22-0501-04	JOINT & COUPLING
20	E04-0259-05	BNC RECEPTACLE
21	F01-0868-03	HEAT SINK
22A	E18-0365-05	AC SELECTOR WITH 6X30MM FUSE
22B	E18-0366-15	AC SELECTOR WITH 5X20MM FUSE
23	E21-0660-04	TERMINAL,CAL
24	E21-0667-05	METAL TERMINAL
25	E23-0552-04	EARTH TERMINAL
26A	E30-1818-05	JIS POWER CORD SET
26B	E30-1819-05	CEE POWER CORD
26C	E30-1820-05	UL/CSA POWER CORD
26D	E30-1821-05	SAA POWER CORD
26E	E30-1644-15	BS POWER CORD
27	F09-0512-04	EDGING
28	F11-1206-03	CRT SHIELD
29	F15-0733-04	FELT (CRT SHIELD)
30	F20-0658-04	INSULATED SHEET
31	F20-0667-04	INSULATED SHEET
32	F20-0685-14	INSULATED SHEET
33	G01-0909-04	COIL SPRING (CAL SHIELD)
34	J02-0089-05	RUBBER FOOT(REAR)
35	J02-0512-05	FOOT(SMALL)
36	J02-0515-04	TILT STAND
37	J10-0418-12	BEZEL
38	J19-1651-04	BLACKET
39	J19-1652-04	BLACKET FOR P.C.B.
40	J19-1653-23	HOLDER FOR CRT
41	J19-1654-14	HOLDER FOR LED
42	J21-2573-04	HOLDER FOR LEG
43	J21-4594-23	BRACKET FOR CRT
45	J61-0516-05	SUPPORT
46	J42-0533-04	BUSHING (FREE)
47	J59-0403-05	NYLON RIVET (ILLUMI)
48	J61-0530-05	WIRE SADDLE
49	K01-0409-05	HANDLE
50	K21-0892-03	KNOB (VOLTS/DIV)
51	K21-0895-13	KNOB
52	K21-0896-13	KNOB
53	K21-0897-14	KNOB
54	K21-0899-04	KNOB
55	K23-0808-03	KNOB
56	K23-0809-03	KNOB
57	K27-0537-04	KNOB,FOR LEVER SWITCH
58	K27-0538-04	KNOB (FOR PUSH SWITCH)
59	L01-9846-05	POWER TRANSFORMER
60	L39-0526-25	ROTATOR COIL
61	L76-0114-05	DELAY LINE
62	F09-0510-04	EDGING
63	F20-0078-05	MICA PLATE
65	R29-1501-05	V.R. 1KB
66	W01-0503-04	REAR RUBBER FOOT/CORD WRAP
67	X73-1830-01	VERTICAL UNIT
68	X73-1840-01	FINAL UNIT
69	X74-1500-01	HORIZONTAL UNIT
70	X80-1060-05	LINE FILTER UNIT
71	X81-2710-01	VR UNIT
72	150VTM31	CRT
73	A13-0942-13	FRAME

MODEL PC-39 (LOW CAPACITY PROBE)



ITEM	DESCRIPTION	PARTS NO.
①	Ground Wire Assembly	E30-1883-08
②	Retractable Hook Tip	E29-0540-08
③	Marker (Orange)	B42-1950-08

DISASSEMBLY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SCREWS

	Parts No.	Parts Name	Figure
A	N08-0611-04	Cord wrapping screw	
B	N09-0623-04	Sems screw (M3 × 8)	
C	N09-0654-05	Sems screw (M4 × 8)	
D	N09-0739-05	Sems taptite screw (3 × 8)	
E	N09-0748-04	Sems screw (M4 × 12)	
F	N10-2030-41	Hexagon nut	
G	N17-1030-41	Toothed lock washer	
H	N30-3012-41	Pan head screw (M3 × 12)	
I	N30-4006-41	Pan head screw (M4 × 6)	
J	N32-3006-41	Flat head screw (M3 × 6)	
K	N32-3008-41	Flat head screw (M3 × 8)	
L	N34-3012-41	Truss head screw (M3 × 12)	
M	N88-3008-41	Flat head taptite screw (3 × 8)	

PARTS LIST

VERTICAL UNIT

(X73-1830-01)

REF.NO	PARTS NO	NAME & DESCRIPTION			
	F01-0863-03	HEAT SINK	169X60XT1.6		
	F02-0519-04	HEAT SINK			
	F10-1590-14	SHIELD PLATE			
	F20-0647-05	INSULATOR			
	J25-5349-12	PCB (UNMOUNTED)			
	J61-0408-05	WIRE WRAPPING BAND			
	N09-0626-04	SCREW.SEMS	M3X10		
	N09-0742-04	SCREW.SEMS	M3X8		
	N19-0191-05	WASHER NONMETAL			
	R92-0150-05	JUMPING RES.	ZERO OHM(10MM)		
	R92-1061-05	JUMPING RES.	ZERO OHM (5MM)		
C001	C91-0501-05	CAP. METAL FILM	0.047	10%	630V
C004	C91-0502-05	CAP. METAL FILM	0.01	20%	630V
C005	CC45FCH1H200J	CAP. CERAMIC	20P	5%	50V
C006	CK45F1H103Z	CAP. CERAMIC	0.01		50V
C007	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C008	CK45FB1H102K	CAP. CERAMIC	1000P	10%	50V
C009	CK45FB1H102K	CAP. CERAMIC	1000P	10%	50V
C010	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C011	CE04EW1H100M	CAP. ELECTRO	10	20%	50V
C012	CE04EW1H100M	CAP. ELECTRO	10	20%	50V
C013	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C014	CE04EW1H100M	CAP. ELECTRO	10	20%	50V
C015	CC45FCH1H100D	CAP. CERAMIC	10P	0.5P	50V
C016	CC45FCH1H150J	CAP. CERAMIC	15P	5%	50V
C017	CK45FB1H102K	CAP. CERAMIC	1000P	10%	50V
C018	CE04EW1H100M	CAP. ELECTRO	10	20%	50V
C019	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C020	CK45F1H103Z	CAP. CERAMIC	0.01		50V
C021	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C022	CE04EW1H100M	CAP. ELECTRO	10	20%	50V
C023	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C024	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C025	CC45FCH1H330J	CAP. CERAMIC	33P	5%	50V
C026	CC45FCH1H330J	CAP. CERAMIC	33P	5%	50V
C027	CC45FCH1H470J	CAP. CERAMIC	47P	5%	50V
C028	CC45FCH1H010C	CAP. CERAMIC	1P	0.25P	50V
C029	CC45FCH1H820J	CAP. CERAMIC	82P	5%	50V
C032	CK45FB1H102K	CAP. CERAMIC	1000P	10%	50V
C033	CK45FB1H102K	CAP. CERAMIC	1000P	10%	50V
C034	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C035	CC45FCH1H151J	CAP. CERAMIC	150P	5%	50V
C036	CC45FCH1H470J	CAP. CERAMIC	47P	5%	50V
C037	CE04EW1E330M	CAP. ELECTRO	33	20%	25V
C038	CE04EW1H100M	CAP. ELECTRO	10	20%	50V
C039	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C040	NO USE				
C041	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C042	CC45FCH1H101J	CAP. CERAMIC	100P	5%	50V
C043	NO USE				
C044	CC45FCH1H270J	CAP. CERAMIC	27P	5%	50V
C045	CC45FCH1H050C	CAP. CERAMIC	5P	0.25P	50V
C046	C91-0769-05	CAP. AXIAL	0.01	20%	16V
C047	CK45F1H103Z	CAP. CERAMIC	0.01		50V
C101	C91-0501-05	CAP. METAL FILM	0.047	10%	630V
C104	C91-0502-05	CAP. METAL FILM	0.01	20%	630V
C105	CC45FCH1H200J	CAP. CERAMIC	20P	5%	50V
C106	CK45F1H103Z	CAP. CERAMIC	0.01		50V
C107	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C108	CK45FB1H102K	CAP. CERAMIC	1000P	10%	50V
C109	CK45FB1H102K	CAP. CERAMIC	1000P	10%	50V
C110	CK45F1H103Z	CAP. CERAMIC	0.01		50V
C111	CE04EW1H100M	CAP. ELECTRO	10	20%	50V
C112	NO USE				
C113	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C114	CE04EW1H100M	CAP. ELECTRO	10	20%	50V
C115	CC45FCH1H100D	CAP. CERAMIC	10P	0.5P	50V
C116	CC45FCH1H150J	CAP. CERAMIC	15P	5%	50V
C117	CK45FB1H102K	CAP. CERAMIC	1000P	10%	50V
C118	CE04EW1H100M	CAP. ELECTRO	10	20%	50V
C119	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C120	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C121	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C122	CE04EW1H100M	CAP. ELECTRO	10	20%	50V
C123	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C124	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C125	CC45FCH1H330J	CAP. CERAMIC	33P	5%	50V
C126	CC45FCH1H330J	CAP. CERAMIC	33P	5%	50V
C127	CC45FCH1H470J	CAP. CERAMIC	47P	5%	50V
C128	CC45FCH1H010C	CAP. CERAMIC	1P	0.25P	50V
C129	CC45FCH1H820J	CAP. CERAMIC	82P	5%	50V
C132	CK45FB1H102K	CAP. CERAMIC	1000P	10%	50V
C133	CK45FB1H102K	CAP. CERAMIC	1000P	10%	50V
C134	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C135	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C136	CC45FCH1H680J	CAP. CERAMIC	68P	5%	50V
C137	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C138	CC45FCH1H101J	CAP. CERAMIC	100P	5%	50V
C139	CE04EW1H100M	CAP. ELECTRO	10	20%	50V
C140	CE04EW1H100M	CAP. ELECTRO	10	20%	50V
C141	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C201	CC45FCH1H090D	CAP. CERAMIC	9P	0.5P	50V
C202	CC45FCH1H090D	CAP. CERAMIC	9P	0.5P	50V
C203	CC45FCH1H100D	CAP. CERAMIC	10P	0.5P	50V
C204	CC45FCH1H100D	CAP. CERAMIC	10P	0.5P	50V
C205	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C206	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C207	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C208	CC45SL1H681J	CAP. CERAMIC	680P	5%	50V
C209	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C210	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C211	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C212	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C213	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C214	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C215	CE04EW1H100M	CAP. ELECTRO	10	20%	50V
C216	CE04EW1H100M	CAP. ELECTRO	10	20%	50V
C217	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C218	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C219	CE04EW1H100M	CAP. ELECTRO	10	20%	50V
C220	NO USE				
C221	CE04EW1H100M	CAP. ELECTRO	10	20%	50V
C222	CE04EW1H100M	CAP. ELECTRO	10	20%	50V
C223	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C301	CE04EW1V222M	CAP. ELECTRO	2200	20%	35V
C302	CE04EW1E332M	CAP. ELECTRO	3300	20%	25V
C305	CE04W2E470M	CAP. ELECTRO	47	20%	250V
C306	CE04W2C010M	CAP. ELECTRO	1	20%	160V
C307	CE04W2C010M	CAP. ELECTRO	1	20%	160V
C308	CE04W2C101M	CAP. ELECTRO	100	20%	160V
C309	CQ92FM1H223K	CAP. MYLAR	0.022	10%	50V
C310	NO USE				
C311	CE04EW2A010M	CAP. ELECTRO	1	20%	100V
C314	CE04EW1V221M	CAP. ELECTRO	220	20%	35V
C315	CE04EW1E470M	CAP. ELECTRO	47	20%	25V
C316	CQ92FM1H223K	CAP. MYLAR	0.022	10%	50V
C317	CE04EW2A010M	CAP. ELECTRO	1	20%	100V
C318	NO USE				
C319	CE04EW1E470M	CAP. ELECTRO	47	20%	25V
C320	CE04EW1E470M	CAP. ELECTRO	47	20%	25V
C321	CE04EW1E470M	CAP. ELECTRO	47	20%	25V
C322	CE04EW1E470M	CAP. ELECTRO	47	20%	25V
C323	CE04EW1E470M	CAP. ELECTRO	47	20%	25V
C351	CQ92FM1H103J	CAP. MYLAR	0.01	5%	50V
C352	CQ92FM1H103J	CAP. MYLAR	0.01	5%	50V
C353	NO USE				
C354	CK45FB1H102K	CAP. CERAMIC	1000P	10%	50V
C355	CE04EW1H100M	CAP. ELECTRO	10	20%	50V
C801	CC45CH1H101J	CAP. CERAMIC	100P	5%	50V
C802	CE04EW2A100M	CAP. ELECTRO	10	20%	100V
C803	CE04EW1E470M	CAP. ELECTRO	47	20%	25V
C804	CQ92M1H104K	CAP. MYLAR	0.1	10%	50V
C805	CQ92M1H104K	CAP. MYLAR	0.1	10%	50V
C901	CC45CH1H101J	CAP. CERAMIC	100P	5%	50V
C902	NO USE				
C903	CC45SL1H221J	CAP. CERAMIC	220P	5%	50V
C908	CK45B1H102K	CAP. CERAMIC	1000P	10%	50V
D001	HZS6.8J(B2)	DIODE, ZENER	6.79V		
D002	1SS132	DIODE			
D003	1SS132	DIODE			
D004	1SS132	DIODE			
D005	1SS132	DIODE			
D006	1SS86	DIODE			
D007	1SS132	DIODE			
D008	1SS132	DIODE			
D101	HZS6.8J(B2)	DIODE, ZENER	6.79V		
D102	1SS132	DIODE			
D103	1SS132	DIODE			
D104	1SS132	DIODE			

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION			
D105	1SS132	DIODE			
D106	1SS86	DIODE			
D107	1SS132	DIODE			
D201	1SS132	DIODE			
D202	1SS132	DIODE			
D203	1SS132	DIODE			
D204	1SS132	DIODE			
D301	S4VB40F1	DIODE, BRIDGE			
D302	HZS13VJ(B2)				
D303	1SS132	DIODE			
D304	1SS132	DIODE			
D305	HZS13VJ(B2)				
D306	1SS132	DIODE			
D307	HZS5.6J(B2)	DIODE, ZENER	5.62V		
D308	S2VB40F1	DIODE, BRIDGE			
D309	1SS132	DIODE			
D310	S2VB40F1	DIODE, BRIDGE			
D311	1SS132	DIODE			
D312	NO USE				
D313	V06B	DIODE			
D801	1SS132	DIODE			
D802	1SS132	DIODE			
D803	1SS132	DIODE			
D804	1SS132	DIODE			
JW003	E31-5649-05	LEAD WIRE WITH CONNECTOR			
JW004	E31-5650-05	LEAD WIRE WITH CONNECTOR			
JW010	E31-5651-05	LEAD WIRE WITH CONNECTOR			
JW011	NO USE				
JW012	E31-5651-05	LEAD WIRE WITH CONNECTOR			
JW027	E31-5670-05	LEAD WIRE WITH CONNECTOR			
JW055	E31-5645-05	LEAD WIRE WITH CONNECTOR			
JW058	E31-5647-05	LEAD WIRE WITH CONNECTOR			
JW059	E31-5648-05	LEAD WIRE WITH CONNECTOR			
JW071	E31-5697-05	LEAD WIRE WITH CONNECTOR			
JW801	E31-5690-05	LEAD WIRE WITH LUG			
L001	L40-1092-13	FERRI INDUCTOR	1UH	20%	
P001	E40-0273-05	PIN CONNECTOR	2P		
P002	E40-0373-05	PIN CONNECTOR	3P		
P003	E40-0773-05	PIN CONNECTOR	7P		
P004	E40-0273-05	PIN CONNECTOR	2P		
P005	E40-0273-05	PIN CONNECTOR	2P		
P006	E40-0373-05	PIN CONNECTOR	3P		
P007	E40-0773-05	PIN CONNECTOR	7P		
P008	NO USE				
P009	E40-0273-05	PIN CONNECTOR	2P		
P010	NO USE				
P011	E40-4235-05	PIN CONNECTOR	6P		
P012	NO USE				
P013	E40-0773-05	PIN CONNECTOR	7P		
P014	E40-0673-05	PIN CONNECTOR	6P		
P020	E40-4101-05	PIN CONNECTOR	4P		
P056	E40-0373-05	PIN CONNECTOR	3P		
P060	E40-0373-05	PIN CONNECTOR	3P		
Q001	2SC1907	TR. SI. NPN			
Q002	2SK304(E)	FET. N-CHANNEL			
Q003	2SC1907	TR. SI. NPN			
Q004	2SA1206(K)	TR. SI. PNP			
Q005	2SC1907	TR. SI. NPN			
Q006	2SC2570A	TR. SI. NPN			
Q007	2SC2570A	TR. SI. NPN			
Q008	2SA1161	TR. SI. PNP			
Q009	2SA1161	TR. SI. PNP			
Q010	2SA1206(K)	TR. SI. PNP			
Q011	2SA1206(K)	TR. SI. PNP			
Q012	2SA1005(K)	TR. SI. PNP			
Q013	2SA1005(K)	TR. SI. PNP			
Q014	2SA1206(K)	TR. SI. PNP			
Q015	2SC2570A	TR. SI. NPN			
Q016	2SC945(Q)	TR. SI. NPN			
Q101	2SC1907	TR. SI. NPN			
Q102	2SK304(E)	FET. N-CHANNEL			
Q103	2SC1907	TR. SI. NPN			
Q104	2SA1206(K)	TR. SI. PNP			
Q105	2SC1907	TR. SI. NPN			
Q106	2SC2570A	TR. SI. NPN			
Q107	2SC2570A	TR. SI. NPN			
Q108	2SA1161	TR. SI. PNP			
Q109	2SA1161	TR. SI. PNP			
Q110	2SA1206(K)	TR. SI. PNP			
Q111	2SA1206(K)	TR. SI. PNP			
Q112	2SA1206(K)	TR. SI. PNP			
Q113	2SA1206(K)	TR. SI. PNP			
Q114	2SA1005(K)	TR. SI. PNP			
Q115	2SA1005(K)	TR. SI. PNP			
Q116	2SA1206(K)	TR. SI. PNP			
Q201	2SA1206(K)	TR. SI. PNP			
Q202	2SA1206(K)	TR. SI. PNP			
Q203	2SC945(Q)	TR. SI. NPN			
Q204	2SA844(D)	TR. SI. PNP			
Q301	2SD880(Y)	TR. SI. NPN			
Q302	NO USE				
Q303	2SD880(Y)	TR. SI. NPN			
Q304	2SA1668	TR. SI. PNP			
Q412	2SD1666	TR. SI. NPN			
R001	RD14BB2C100J	RES. CARBON	10	5%	1/6W
R002	RD14BB2C105J	RES. CARBON	1M	5%	1/6W
R013	RN14BK2E1004F	RES. METAL FILM	1M	1%	1/4W
R014	RD14BB2E824J	RES. CARBON	820K	5%	1/4W
R015	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R016	RD14BB2C681J	RES. CARBON	680	5%	1/6W
R017	RD14BB2E274J	RES. CARBON	270K	5%	1/4W
R018	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R019	RD14BB2C561J	RES. CARBON	560	5%	1/6W
R020	RD14BB2C392J	RES. CARBON	3.9K	5%	1/6W
R021	RD14BB2C822J	RES. CARBON	8.2K	5%	1/6W
R022	RD14BB2C680J	RES. CARBON	68	5%	1/6W
R023	RD14BB2C562J	RES. CARBON	5.6K	5%	1/6W
R024	RD14BB2E100J	RES. CARBON	10	5%	1/4W
R025	RD14BB2C391J	RES. CARBON	390	5%	1/6W
R026	RD14BB2C122J	RES. CARBON	1.2K	5%	1/6W
R027	RD14BB2E100J	RES. CARBON	10	5%	1/4W
R035	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R036	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R037	RD14BB2C392J	RES. CARBON	3.9K	5%	1/6W
R038	RD14BB2C392J	RES. CARBON	3.9K	5%	1/6W
R039	RD14BB2C181J	RES. CARBON	180	5%	1/6W
R040	RN14BK2C3300F	RES. METAL FILM	330	1%	1/6W
R041	RD14BB2C224J	RES. CARBON	220K	5%	1/6W
R042	RD14BB2C100J	RES. CARBON	10	5%	1/6W
R043	RN14BK2C3300F	RES. METAL FILM	330	1%	1/6W
R044	RN14BK2E1200F	RES. METAL FILM	120	1%	1/4W
R045	RN14BK2E1200F	RES. METAL FILM	120	1%	1/4W
R046	RD14BB2C392J	RES. CARBON	3.9K	5%	1/6W
R047	RD14BB2C392J	RES. CARBON	3.9K	5%	1/6W
R048	RD14BB2C681J	RES. CARBON	680	5%	1/6W
R049	RD14BB2C181J	RES. CARBON	180	5%	1/6W
R050	RD14BB2C181J	RES. CARBON	180	5%	1/6W
R051	RN14BK2C33R0F	RES. METAL FILM	33.0	1%	1/6W
R052	RN14BK2C33R0F	RES. METAL FILM	33.0	1%	1/6W
R053	RD14BB2C560J	RES. CARBON	56	5%	1/6W
R054	RD14BB2C330J	RES. CARBON	33	5%	1/6W
R055	RN14BK2C3900F	RES. METAL FILM	390	1%	1/6W
R056	RN14BK2C3900F	RES. METAL FILM	390	1%	1/6W
R057	RN14BK2C33R0F	RES. METAL FILM	33.0	1%	1/6W
R058	RN14BK2C33R0F	RES. METAL FILM	33.0	1%	1/6W
R059	RN14BK2C1800F	RES. METAL FILM	180	1%	1/6W
R060	RN14BK2C3900F	RES. METAL FILM	390	1%	1/6W
R061	RN14BK2C3900F	RES. METAL FILM	390	1%	1/6W
R062	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R063	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R064	RN14BK2C1200F	RES. METAL FILM	120	1%	1/6W
R065	RD14BB2C122J	RES. CARBON	1.2K	5%	1/6W
R066	RD14BB2C122J	RES. CARBON	1.2K	5%	1/6W
R067	RD14BB2C181J	RES. CARBON	180	5%	1/6W
R068	RD14BB2C181J	RES. CARBON	180	5%	1/6W
R069	RN14BK2C1000F	RES. METAL FILM	100	1%	1/6W
R070	RD14BB2C822J	RES. CARBON	8.2K	5%	1/6W
R071	RD14BB2C822J	RES. CARBON	8.2K	5%	1/6W
R072	RD14BB2C330J	RES. CARBON	33	5%	1/6W
R073	RD14BB2C330J	RES. CARBON	33	5%	1/6W
R074	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R075	RD14BB2C561J	RES. CARBON	560	5%	1/6W
R076	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R077	RD14BB2C682J	RES. CARBON	6.8K	5%	1/6W
R078	RD14BB2C100J	RES. CARBON	10	5%	1/6W
R079	RD14BB2C100J	RES. CARBON	10	5%	1/6W
R080	RD14BB2C470J	RES. CARBON	47	5%	1/6W

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION			
R081	RD14BB2C122J	RES. CARBON	1.2K	5%	1/6W
R082	RD14BB2C122J	RES. CARBON	1.2K	5%	1/6W
R083	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R084	RD14BB2C392J	RES. CARBON	3.9K	5%	1/6W
R085	RD14BB2C682J	RES. CARBON	6.8K	5%	1/6W
R086	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R087	RD14BB2E102J	RES. CARBON	1K	5%	1/4W
R088	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R089	RD14BB2C112J	RES. CARBON	1.1K	5%	1/6W
R090	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R091	RD14BB2C360J	RES. CARBON	36	5%	1/6W
R092	RD14BB2C330J	RES. CARBON	33	5%	1/6W
R093	RD14BB2C100J	RES. CARBON	10	5%	1/6W
R094	RD14BB2E562J	RES. CARBON	5.6K	5%	1/4W
R101	RD14BB2C100J	RES. CARBON	10	5%	1/6W
R102	RD14BB2C105J	RES. CARBON	1M	5%	1/6W
R113	RN14BK2E1004F	RES. METAL FILM	1M	1%	1/4W
R114	RD14BB2E824J	RES. CARBON	820K	5%	1/4W
R115	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R116	RD14BB2C681J	RES. CARBON	680	5%	1/6W
R117	RD14BB2C274J	RES. CARBON	270K	5%	1/6W
R118	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R119	RD14BB2C561J	RES. CARBON	560	5%	1/6W
R120	RD14BB2C392J	RES. CARBON	3.9K	5%	1/6W
R121	RD14BB2C822J	RES. CARBON	8.2K	5%	1/6W
R122	RD14BB2C680J	RES. CARBON	68	5%	1/6W
R123	RD14BB2C562J	RES. CARBON	5.6K	5%	1/6W
R124	RD14BB2E100J	RES. CARBON	10	5%	1/4W
R125	RD14BB2C391J	RES. CARBON	390	5%	1/6W
R126	RD14BB2C122J	RES. CARBON	1.2K	5%	1/6W
R127	RD14BB2E100J	RES. CARBON	10	5%	1/4W
R135	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R136	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R137	RD14BB2C392J	RES. CARBON	3.9K	5%	1/6W
R138	RD14BB2C392J	RES. CARBON	3.9K	5%	1/6W
R139	RD14BB2C181J	RES. CARBON	180	5%	1/6W
R140	RN14BK2E3300F	RES. METAL FILM	330	1%	1/4W
R141	RD14BB2C224J	RES. CARBON	220K	5%	1/6W
R142	RD14BB2C100J	RES. CARBON	10	5%	1/6W
R143	RN14BK2E3300F	RES. METAL FILM	330	1%	1/4W
R144	RN14BK2E1200F	RES. METAL FILM	120	1%	1/4W
R145	RN14BK2E1200F	RES. METAL FILM	120	1%	1/4W
R146	RD14BB2C392J	RES. CARBON	3.9K	5%	1/6W
R147	RD14BB2C392J	RES. CARBON	3.9K	5%	1/6W
R148	RD14BB2C681J	RES. CARBON	680	5%	1/6W
R149	RD14BB2C181J	RES. CARBON	180	5%	1/6W
R150	RD14BB2C181J	RES. CARBON	180	5%	1/6W
R151	RN14BK2C33R0F	RES. METAL FILM	33.0	1%	1/6W
R152	RN14BK2C33R0F	RES. METAL FILM	33.0	1%	1/6W
R153	RD14BB2C560J	RES. CARBON	56	5%	1/6W
R154	RD14BB2C330J	RES. CARBON	33	5%	1/6W
R155	RN14BK2C3900F	RES. METAL FILM	390	1%	1/6W
R156	RN14BK2C3900F	RES. METAL FILM	390	1%	1/6W
R157	RN14BK2C33R0F	RES. METAL FILM	33.0	1%	1/6W
R158	RN14BK2C33R0F	RES. METAL FILM	33.0	1%	1/6W
R159	RN14BK2C1800F	RES. METAL FILM	180	1%	1/6W
R160	RN14BK2C3900F	RES. METAL FILM	390	1%	1/6W
R161	RN14BK2C3900F	RES. METAL FILM	390	1%	1/6W
R162	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R163	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R164	RN14BK2C1200F	RES. METAL FILM	120	1%	1/6W
R165	RD14BB2C122J	RES. CARBON	1.2K	5%	1/6W
R166	RD14BB2C122J	RES. CARBON	1.2K	5%	1/6W
R167	RD14BB2C181J	RES. CARBON	180	5%	1/6W
R168	RD14BB2C181J	RES. CARBON	180	5%	1/6W
R169	RN14BK2C1000F	RES. METAL FILM	100	1%	1/6W
R170	RD14BB2C822J	RES. CARBON	8.2K	5%	1/6W
R171	RD14BB2C822J	RES. CARBON	8.2K	5%	1/6W
R172	RD14BB2C330J	RES. CARBON	33	5%	1/6W
R173	RD14BB2C330J	RES. CARBON	33	5%	1/6W
R174	RD14BB2C330J	RES. CARBON	33	5%	1/6W
R175	RD14BB2C330J	RES. CARBON	33	5%	1/6W
R176	RD14BB2C182J	RES. CARBON	1.8K	5%	1/6W
R177	RD14BB2C182J	RES. CARBON	1.8K	5%	1/6W
R178	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R179	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R180	RD14BB2C100J	RES. CARBON	10	5%	1/6W
R181	RD14BB2C100J	RES. CARBON	10	5%	1/6W
R182	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R183	RD14BB2C122J	RES. CARBON	1.2K	5%	1/6W
R184	RD14BB2C122J	RES. CARBON	1.2K	5%	1/6W
R185	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R186	RD14BB2C392J	RES. CARBON	3.9K	5%	1/6W
R187	RD14BB2C682J	RES. CARBON	6.8K	5%	1/6W
R188	RN14BK2C3300F	RES. METAL FILM	330	1%	1/6W
R189	RD14BB2C562J	RES. CARBON	5.6K	5%	1/6W
R190	RD14BB2C100J	RES. CARBON	10	5%	1/6W
R201	RD14BB2C391J	RES. CARBON	390	5%	1/6W
R202	RD14BB2C391J	RES. CARBON	390	5%	1/6W
R203	RN14BK2C3300F	RES. METAL FILM	330	1%	1/6W
R204	RN14BK2C3300F	RES. METAL FILM	330	1%	1/6W
R207	RD14BB2C682J	RES. CARBON	6.8K	5%	1/6W
R208	RD14BB2C682J	RES. CARBON	6.8K	5%	1/6W
R209	RD14BB2C821J	RES. CARBON	820	5%	1/6W
R210	RD14BB2C821J	RES. CARBON	820	5%	1/6W
R211	RD14BB2C820J	RES. CARBON	82	5%	1/6W
R212	RD14BB2C820J	RES. CARBON	82	5%	1/6W
R213	RD14BB2C100J	RES. CARBON	10	5%	1/6W
R214	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R215	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R216	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R217	RD14BB2E103J	RES. CARBON	10K	5%	1/4W
R218	RD14BB2E103J	RES. CARBON	10K	5%	1/4W
R219	RD14BB2E103J	RES. CARBON	10K	5%	1/4W
R220	R90-0645-05	RES. NETWORK	4X10K	5%	
R221	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R222	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R223	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R224	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R225	RD14BB2E101J	RES. CARBON	100	5%	1/4W
R226	RD14BB2E101J	RES. CARBON	100	5%	1/4W
R227	RD14BB2C100J	RES. CARBON	10	5%	1/6W
R228	RD14BB2C100J	RES. CARBON	10	5%	1/6W
R229	RD14BB2C100J	RES. CARBON	10	5%	1/6W
R230	RD14BB2C681J	RES. CARBON	680	5%	1/6W
R231	RD14BB2C681J	RES. CARBON	680	5%	1/6W
R232	RD14BB2E100J	RES. CARBON	10	5%	1/4W
R301	RS14GB3D2R2J	RES. METAL FILM	2.2	5%	2W
R302	RD14BB2E101J	RES. CARBON	100	5%	1/4W
R303	RS14GB3D470J	RES. METAL FILM	47	5%	2W
R304	RN14BK2C1202F	RES. METAL FILM	12K	1%	1/6W
R305	RN14BK2C1202F	RES. METAL FILM	12K	1%	1/6W
R306	RS14GB3D010J	RES. METAL FILM	1	5%	2W
R307	RS14GB3F270J	RES. METAL FILM	27	5%	3W
R308	RN14BK2C5601F	RES. METAL FILM	5.6K	1%	1/6W
R309	RN14BK2C5601F	RES. METAL FILM	5.6K	1%	1/6W
R310	RN14BK2C5601F	RES. METAL FILM	5.6K	1%	1/6W
R311	RS14GB3D220J	RES. METAL FILM	22	5%	2W
R312	RN14BK2C3901F	RES. METAL FILM	3.9K	1%	1/6W
R313	RN14BK2C9101F	RES. METAL FILM	9.1K	1%	1/6W
R314	RS14GB3A270J	RES. METAL FILM	27	5%	1W
R315	RS14GB3D272J	RES. METAL FILM	2.7K	5%	2W
R316	NO USE				
R317	RD14BB2E4R7J	RES. CARBON	4.7	5%	1/4W
R318	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R319	RD14BB2C561J	RES. CARBON	560	5%	1/6W
R320	RN14BK2C1153F	RES. METAL FILM	115K	1%	1/6W
R321	RN14BK2E1002F	RES. METAL FILM	10K	1%	1/4W
R322	RS14GB3A270J	RES. METAL FILM	27	5%	1W
R323	RS14GB3A472J	RES. METAL FILM	4.7K	5%	1W
R324	RD14BB2C4R7J	RES. CARBON	4.7	5%	1/6W
R325	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R326	RD14BB2E221J	RES. CARBON	220	5%	1/4W
R327	RN14BK2C5602F	RES. METAL FILM	56K	1%	1/6W
R328	RD14BB2C561J	RES. CARBON	560	5%	1/6W
R334	RN14BK2C1152F	RES. METAL FILM	11.5K	1%	1/6W
R335	RD14BB2C561J	RES. CARBON	560	5%	1/6W
R340	RD14BB2E225J	RES. CARBON	2.2M	5%	1/4W
R341	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R351	RD14BB2C184J	RES. CARBON	180K	5%	1/6W
R352	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R353	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R354	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R355	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R356	RD14BB2C224J	RES. CARBON	220K	5%	1/6W
R357	RD14BB2C474J	RES. CARBON	470K	5%	1/6W
R358	RD14BB2C474J	RES. CARBON	470K	5%	1/6W
R359	RD14BB2C471J	RES. CARBON	470	5%	1/6W
R360	RN14BK2C1102F	RES. METAL FILM	11K	1%	1/6W
R361	RN14BK2C7500F	RES. METAL FILM	750	1%	1/6W
R362	NO USE				
R363	RD14BB2C100J	RES. CARBON	10	5%	1/6W
R801	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R802	RD14BB2C390J	RES. CARBON	39	5%	1/6W
R803	RD14BB2C331J	RES. CARBON	330	5%	1/6W
R804	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R805	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R806	RD14BB2C331J	RES. CARBON	330	5%	1/6W

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION
R807	RD14BB2E910J	RES. CARBON 91 5% 1/4W
R808	RD14BB2E910J	RES. CARBON 91 5% 1/4W
R901	RD14BB2C104J	RES. CARBON 100K 5% 1/6W
S001	S32-4007-05	LEVER SWITCH 4-3
S002	S02-4513-05	
S101	S32-4007-05	LEVER SWITCH 4-3
S102	S02-4513-05	
S201	S32-4008-05	LEVER SWITCH 4-5
TC005	C05-0453-05	CAP. TRIMMER 10P
TC006	C05-0453-05	CAP. TRIMMER 10P
TC007	C05-0456-05	CAP. TRIMMER 60PF
TC008	C05-0456-05	CAP. TRIMMER 60PF
TC105	C05-0453-05	CAP. TRIMMER 10P
TC106	C05-0453-05	CAP. TRIMMER 10P
TC107	C05-0456-05	CAP. TRIMMER 60PF
TC108	C05-0456-05	CAP. TRIMMER 60PF
TH001	SDT-100	THERMISTOR
TH002	111-400-3	THERMISTER
TH101	SDT-100	THERMISTOR
TH102	111-400-3	THERMISTER
U001	LF411CN	IC.DUAL JFET INPUT OP AMP
U002	CA3127E	IC. TR. ARRAY NPN
U101	LF411CN	IC.DUAL JFET INPUT OP AMP
U102	CA3127E	IC. TR. ARRAY NPN
U201	SN74LS47N	IC. DECODER/DRIVER
U202	SN74LS00N	IC. QUAD 2 INPUT NAND
U203	SN74LS00N	IC. QUAD 2 INPUT NAND
U204	SN74LS112AN	IC. DUAL JK-FF
U205	SN74LS00N	IC. QUAD 2 INPUT NAND
U301	NJM4558D	IC.DUAL OP AMP
U302	NJM4558D	IC.DUAL OP AMP
U303	NJM4558D	IC.DUAL OP AMP
U304	78020AP	
U351	TC4011BP	IC. QUAD 2-INPUT NAND GATE
VR001	R12-4516-05	RES. SEMI FIXED 50K B
VR002	R12-3550-05	RES. SEMI FIXED 20K B
VR003	R12-0577-05	RES. SEMI FIXED 500 B
VR004	R12-0575-05	RES. SEMI FIXED 100 B
VR005	R12-1546-05	RES. SEMI FIXED 2K B
VR006	NO USE	
VR007	R12-3550-05	RES. SEMI FIXED 20K B
VR008	R12-0576-05	RES. SEMI FIXED 200 B
VR009	R12-0577-05	RES. SEMI FIXED 500 B
VR010	R12-1545-05	RES. SEMI FIXED 1K B
VR011	R12-1545-05	RES. SEMI FIXED 1K B
VR101	R12-4516-05	RES. SEMI FIXED 50K B
VR102	R12-3550-05	RES. SEMI FIXED 20K B
VR103	R12-0577-05	RES. SEMI FIXED 500 B
VR104	R12-0575-05	RES. SEMI FIXED 100 B
VR105	R12-1546-05	RES. SEMI FIXED 2K B
VR106	NO USE	
VR107	R12-3550-05	RES. SEMI FIXED 20K B
VR108	R12-0576-05	RES. SEMI FIXED 200 B
VR109	R12-0577-05	RES. SEMI FIXED 500 B
VR110	R12-1545-05	RES. SEMI FIXED 1K B
VR111	R12-1545-05	RES. SEMI FIXED 1K B
VR201	R12-0575-05	RES. SEMI FIXED 100 B
VR301	R12-1545-05	RES. SEMI FIXED 1K B
VR351	R12-0577-05	RES. SEMI FIXED 500 B

VERTICAL FINAL UNIT

(X73-1840-01)

REF.NO	PARTS NO	NAME & DESCRIPTION
	F02-0511-05	HEAT SINK(Q13,14)
	J25-5347-13	PCB (UNMOUNTED)
	J30-0605-05	SPACER
	L92-0110-05	FERRITE BEADS
C002	CC45CH1H271J	CAP. CERAMIC 270P 5% 50V
C003	CK45FB1H222K	CAP. CERAMIC 2200P 10% 50V
C004	CQ92M1H104K	CAP. MYLAR 0.1 10% 50V
C005	C91-1275-05	CAP. ELECTRO 0.033F 5.5V
C006	C91-1275-05	CAP. ELECTRO 0.033F 5.5V
C010	CE04HW1C100M	CAP. ELECTRO 10 20% 16V
C011	CK45FF1H103Z	CAP. CERAMIC 0.01 50V
C012	CK45F1H103Z	CAP. CERAMIC 0.01 50V
C013	CK45FF1H103Z	CAP. CERAMIC 0.01 50V
C014	CK45FF1H103Z	CAP. CERAMIC 0.01 50V
C015	CK45FF1H103Z	CAP. CERAMIC 0.01 50V
C019	C91-0769-05	CAP. AXIAL 0.01 20% 16V
C020	C91-0769-05	CAP. AXIAL 0.01 20% 16V
C021	C91-1309-05	CAP. CERAMIC 0.01 10% 500V
C022	C91-1309-05	CAP. CERAMIC 0.01 10% 500V
C023	CQ92FM1H104K	CAP. MYLAR 0.1 10% 50V
C024	CE04EW1E470M	CAP. ELECTRO 47 20% 25V
C025	CQ92M1H104K	CAP. MYLAR 0.1 10% 50V
C026	CE04EW1E470M	CAP. ELECTRO 47 20% 25V
C027	CQ92FM1H104K	CAP. MYLAR 0.1 10% 50V
C028	CE04EW1E470M	CAP. ELECTRO 47 20% 25V
C029	C91-1309-05	CAP. CERAMIC 0.01 10% 500V
C030	C91-1309-05	CAP. CERAMIC 0.01 10% 500V
C031	C91-1309-05	CAP. CERAMIC 0.01 10% 500V
C032	CQ92FM1H104K	CAP. MYLAR 0.1 10% 50V
C033	CE04EW1E470M	CAP. ELECTRO 47 20% 25V
C034	CK45FF1H103Z	CAP. CERAMIC 0.01 50V
C035	CK45FF1H103Z	CAP. CERAMIC 0.01 50V
C036	CE04W2C010M	CAP. ELECTRO 1 20% 160V
C102	CK45FF1H103Z	CAP. CERAMIC 0.01 50V
C201	CE04EW1E100M	CAP. ELECTRO 10 20% 25V
C202	CK45FF1H103Z	CAP. CERAMIC 0.01 50V
C203	CK45FB1H102K	CAP. CERAMIC 1000P 10% 50V
C204	NO USE	
C205	CC45FCH1H680J	CAP. CERAMIC 68P 5% 50V
C206	CK45FF1H103Z	CAP. CERAMIC 0.01 50V
C207	CC45FCH1H070D	CAP. CERAMIC 7P 0.5P 50V
C208	CK45FF1H103Z	CAP. CERAMIC 0.01 50V
C209	CC45FCH1H330J	CAP. CERAMIC 33P 5% 50V
C210	CE04EW1E100M	CAP. ELECTRO 10 20% 25V
C211	CE04EW1E100M	CAP. ELECTRO 10 20% 25V
C212	C91-1309-05	CAP. CERAMIC 0.01 10% 500V
C213	C91-1309-05	CAP. CERAMIC 0.01 10% 500V
C214	C91-1269-05	CAP. POLYESTER 0.047 10% 250V
C215	C91-1269-05	CAP. POLYESTER 0.047 10% 250V
C216	CE04EW1E100M	CAP. ELECTRO 10 20% 25V
C217	CK45FF1H103Z	CAP. CERAMIC 0.01 50V
C218	CK45FF1H103Z	CAP. CERAMIC 0.01 50V
C219	CK45F1H103Z	CAP. CERAMIC 0.01 50V
C801	CQ92M1H104K	CAP. MYLAR 0.1 10% 50V
C802	CQ92M1H102K	CAP. MYLAR 1000P 10% 50V
C803	CQ92M1H223K	CAP. MYLAR 0.022 10% 50V
C901	CC45CH1H680J	CAP. CERAMIC 68P 5% 50V
C904	CC45CH1H470J	CAP. CERAMIC 47P 5% 50V
D001	MA700	DIODE
D002	MA700	DIODE
D105	MA700	DIODE
D106	NO USE	
D107	1SS132	DIODE
D108	MA700	DIODE
D109	NO USE	
D110	1SS132	DIODE
D201	1SS132	DIODE
D202	MA700	DIODE
D203	MA700	DIODE
L001	L40-4701-03	FERRI INDUCTOR 47UH 10%
L002	L40-4701-03	FERRI INDUCTOR 47UH 10%
L003	L40-4701-03	FERRI INDUCTOR 47UH 10%

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION			
L004	L40-4701-03	FERRI INDUCTOR	47UH	10%	
L005	L40-4701-03	FERRI INDUCTOR	47UH	10%	
L006	L40-4701-03	FERRI INDUCTOR	47UH	10%	
L007	L40-3381-70	FERRI INDUCTOR	0.33UH	10%	
L008	L40-3381-70	FERRI INDUCTOR	0.33UH	10%	
P006	E40-0373-05	PIN CONNECTOR	3P		
P007	NO USE				
P008	E40-0373-05	PIN CONNECTOR	3P		
P013	E40-0773-05	PIN CONNECTOR	7P		
P029	E40-0873-05	PIN CONNECTOR	8P		
P034	E23-0401-05	PIN TERMINAL			
P048	E40-0473-05	PIN CONNECTOR	4P		
P062	E40-0373-05	PIN CONNECTOR	3P		
Q001	2SC2671(H)	TR. SI. NPN			
Q002	2SC2671(H)	TR. SI. NPN			
Q003	2SA1206(K)	TR. SI. PNP			
Q004	2SA1206(K)	TR. SI. PNP			
Q005	2SC2671(H)	TR. SI. NPN			
Q006	2SC2671(H)	TR. SI. NPN			
Q007	2SC2785(F)	TR. SI. NPN			
Q008	2SA1206(K)	TR. SI. PNP			
Q009	2SA1206(K)	TR. SI. PNP			
Q012	2SC2671(H)	TR. SI. NPN			
Q013	2SC2671(H)	TR. SI. NPN			
Q014	2SC3779(D)	TR. SI. NPN			
Q015	2SC3779(D)	TR. SI. NPN			
Q016	2SC3779(D)	TR. SI. NPN			
Q017	2SC3779(D)	TR. SI. NPN			
Q018	2SC1164(O)	TR. SI. NPN			
Q019	2SC1164(O)	TR. SI. NPN			
Q201	2SC1907	TR. SI. NPN			
Q202	2SC1907	TR. SI. NPN			
Q203	2SA1015(Y)	TR. SI. PNP			
Q204	2SA1015(Y)	TR. SI. PNP			
Q205	2SC1907	TR. SI. NPN			
Q206	2SC1907	TR. SI. NPN			
Q207	2SA1005(K)	TR. SI. PNP			
Q208	2SA1005(K)	TR. SI. PNP			
Q209	2SC1907	TR. SI. NPN			
Q210	2SC1907	TR. SI. NPN			
Q211	2SC3423	TR. SI. NPN			
Q212	2SC3423	TR. SI. NPN			
Q213	2SA1360(Y)	TR. SI. PNP			
Q214	2SA1360(Y)	TR. SI. PNP			
R001	RN14BK2C91R0F	RES. METAL FILM	91.0	1%	1/6W
R002	RN14BK2C91R0F	RES. METAL FILM	91.0	1%	1/6W
R003	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R004	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R005	RN14BK2C82R0F	RES. METAL FILM	82.0	1%	1/6W
R006	RD14BB2C471J	RES. CARBON	470	5%	1/6W
R007	RD14BB2C471J	RES. CARBON	470	5%	1/6W
R008	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R009	RD14BB2C682J	RES. CARBON	6.8K	5%	1/6W
R010	RD14BB2C203J	RES. CARBON	20K	5%	1/6W
R011	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R012	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R013	RD14BB2C331J	RES. CARBON	330	5%	1/6W
R014	RD14BB2C331J	RES. CARBON	330	5%	1/6W
R017	RN14BK2C2701F	RES. METAL FILM	2.7K	1%	1/6W
R018	RN14BK2C2201F	RES. METAL FILM	2.2K	1%	1/6W
R019	RN14BK2C3000F	RES. METAL FILM	300	1%	1/6W
R020	RN14BK2C3000F	RES. METAL FILM	300	1%	1/6W
R021	RN14BK2C2700F	RES. METAL FILM	270	1%	1/6W
R022	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R023	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R024	RN14BK2C1000F	RES. METAL FILM	100	1%	1/6W
R025	RN14BK2C1000F	RES. METAL FILM	100	1%	1/6W
R026	RD14BB2C331J	RES. CARBON	330	5%	1/6W
R027	RN14BK2C4701F	RES. METAL FILM	4.7K	1%	1/6W
R028	RN14BK2C3601F	RES. METAL FILM	3.6K	1%	1/6W
R029	RD14BB2C681J	RES. CARBON	680	5%	1/6W
R030	RD14BB2C681J	RES. CARBON	680	5%	1/6W
R031	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R032	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R033	RN14BK2C3900F	RES. METAL FILM	390	1%	1/6W
R034	RN14BK2C3900F	RES. METAL FILM	390	1%	1/6W
R037	RN14BK2C91R0F	RES. METAL FILM	91.0	1%	1/6W
R042	RN14BK2E3900F	RES. METAL FILM	390	1%	1/4W
R043	RN14BK2E3900F	RES. METAL FILM	390	1%	1/4W
R044	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R045	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R046	RD14BB2E361J	RES. CARBON	360	5%	1/4W
R047	RD14BB2E361J	RES. CARBON	360	5%	1/4W
R048	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R049	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R050	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R051	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R052	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R053	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R054	RN14BK2E33R0F	RES. METAL FILM	33.0	1%	1/4W
R055	RN14BK2E33R0F	RES. METAL FILM	33.0	1%	1/4W
R056	RD14BB2E100J	RES. CARBON	10	5%	1/4W
R057	RD14BB2C471J	RES. CARBON	470	5%	1/6W
R060	RD14BB2E220J	RES. CARBON	22	5%	1/4W
R061	RD14BB2E220J	RES. CARBON	22	5%	1/4W
R062	RS14GB3F911J	RES. METAL FILM	910	5%	3W
R063	RS14GB3F102J	RES. METAL FILM	1K	5%	3W
R064	RS14GB3F911J	RES. METAL FILM	910	5%	3W
R065	RS14GB3F102J	RES. METAL FILM	1K	5%	3W
R066	RD14BB2E391J	RES. CARBON	390	5%	1/4W
R067	RD14BB2E391J	RES. CARBON	390	5%	1/4W
R070	RD14BB2C183J	RES. CARBON	18K	5%	1/6W
R114	RN14BK2C4700F	RES. METAL FILM	470	1%	1/6W
R135	RD14BB2E103J	RES. CARBON	10K	5%	1/4W
R201	RN14BK2C4700F	RES. METAL FILM	470	1%	1/6W
R202	RN14BK2C3741F	RES. METAL FILM	3.74K	1%	1/6W
R203	RD14BB2C561J	RES. CARBON	560	5%	1/6W
R204	RN14BK2C4700F	RES. METAL FILM	470	1%	1/6W
R205	RD14BB2E682J	RES. CARBON	6.8K	5%	1/4W
R206	RN14BK2C2401F	RES. METAL FILM	2.4K	1%	1/6W
R207	RD14BB2C182J	RES. CARBON	1.8K	5%	1/6W
R208	RD14BB2C182J	RES. CARBON	1.8K	5%	1/6W
R209	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R210	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R211	RN14BK2C47R0F	RES. METAL FILM	47.0	1%	1/6W
R212	RD14BB2C331J	RES. CARBON	330	5%	1/6W
R213	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R214	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R215	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R216	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R217	RN14BK2C6800F	RES. METAL FILM	680	1%	1/6W
R218	RD14BB2C471J	RES. CARBON	470	5%	1/6W
R219	RD14BB2C471J	RES. CARBON	470	5%	1/6W
R220	RD14BB2E822J	RES. CARBON	8.2K	5%	1/4W
R221	RN14BK2C1002F	RES. METAL FILM	10K	1%	1/6W
R222	RD14BB2C242J	RES. CARBON	2.4K	5%	1/6W
R223	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R224	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R225	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R226	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R227	RD14BB2C124J	RES. CARBON	120K	5%	1/6W
R228	RD14BB2C124J	RES. CARBON	120K	5%	1/6W
R229	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R230	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R231	RD14BB2C391J	RES. CARBON	390	5%	1/6W
R232	RD14BB2C391J	RES. CARBON	390	5%	1/6W
R233	NO USE				
R234	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R235	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R236	RD14BY2H473J	RES. CARBON	47K	5%	1/2W
R237	RD14BY2H473J	RES. CARBON	47K	5%	1/2W
R238	RD14BY2H683J	RES. CARBON	68K	5%	1/2W
R239	RD14BY2H683J	RES. CARBON	68K	5%	1/2W
R240	NO USE				
R241	RN14BK2C1201F	RES. METAL FILM	1.2K	1%	1/6W
R242	RN14BK2C1201F	RES. METAL FILM	1.2K	1%	1/6W
R801	RD14BB2C124J	RES. CARBON	120K	5%	1/6W
R802	RD14BB2C203J	RES. CARBON	20K	5%	1/6W
R803	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R804	RD14BB2C153J	RES. CARBON	15K	5%	1/6W
R902	RD14BB2C471J	RES. CARBON	470	5%	1/6W
R903	RD14BB2C391J	RES. CARBON	390	5%	1/6W
R904	RD14BB2E154J	RES. CARBON	150K	5%	1/4W
R905	NO USE				
R906	RD14BB2C432J	RES. CARBON	4.3K	5%	1/6W

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION			
R907	RD14BB2C681J	RES. CARBON	680	5%	1/6W
R910	RD14BB2C162J	RES. CARBON	1.6K	5%	1/6W
R911	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
TC001	C05-0454-05	CAP. TRIMMER	20PF		
TC002	NO USE				
TC003	C05-0455-05	CAP. TRIMMER	30PF		
TC004	C05-0453-05	CAP. TRIMMER	10P		
TH901	SDT1000	THERMISTOR			
VR001	R12-1545-05	RES. SEMI FIXED	1K B		
VR002	R12-0576-05	RES. SEMI FIXED	200 B		
VR005	R12-0577-05	RES. SEMI FIXED	500 B		
VR006	R12-0575-05	RES. SEMI FIXED	100 B		
VR201	R12-1546-05	RES. SEMI FIXED	2K B		
VR202	R12-0575-05	RES. SEMI FIXED	100 B		
VR203	R12-7508-05	RES. SEMI FIXED	500K B		

HORIZONTAL UNIT

(X74-1500-01)

REF.NO	PARTS NO	NAME & DESCRIPTION			
	F01-0867-05	HEAT SINK			
	F11-1208-03	SHIELD CASE			
	F15-0727-04	HOLDER (NEON LAMP)			
	F20-0647-05	INSULATOR			
	J25-5348-22	PCB (UNMOUNTED)			
	J42-0538-04	BUSHING			
	L92-0110-05	FERRITE BEADS			
	N19-0191-05	WASHER NONMETAL			
	N30-3006-41	SCREW, PAN HD	M3X6		
	R92-1061-05	JUMPING RES.	ZERO OHM (5MM)		
C001	CC45CH1H010C	CAP. CERAMIC	1P	0.25P	50V
C002	CE04EW1E100M	CAP. ELECTRO	10	20%	25V
C003	CE04EW1E100M	CAP. ELECTRO	10	20%	25V
C004	CQ92FM1H223K	CAP. MYLAR	0.022	10%	50V
C005	CC45FSL1H221J	CAP. CERAMIC	220P	5%	50V
C006	CQ92FM1H222K	CAP. MYLAR	2200P	10%	50V
C007	CK45FB1H102K	CAP. CERAMIC	1000P	10%	50V
C008	CE04EW1E100M	CAP. ELECTRO	10	20%	25V
C009	CE04EW1E100M	CAP. ELECTRO	10	20%	25V
C013	CC45FCH1H050C	CAP. CERAMIC	5P	0.25P	50V
C016	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C019	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C020	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C021	CS15E1V010M	CAP. TANTALUM	1	20%	35V
C022	CS15E1V010M	CAP. TANTALUM	1	20%	35V
C023	CK45F1H103Z	CAP. CERAMIC	0.01		50V
C024	CE04BW1E220M	CAP. ELECTRO	22	20%	25V
C025	CE04EW1E100M	CAP. ELECTRO	10	20%	25V
C026	CE04EW1E470M	CAP. ELECTRO	47	20%	25V
C027	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C028	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C029	CQ92FM1H223K	CAP. MYLAR	0.022	10%	50V
C030	CC45CH1H150J	CAP. CERAMIC	15P	5%	50V
C031	CE04EW1E100M	CAP. ELECTRO	10	20%	25V
C032	CE04EW1E100M	CAP. ELECTRO	10	20%	25V
C033	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C034	CE04EW1E100M	CAP. ELECTRO	10	20%	25V
C035	NO USE				
C036	CK45F1H103Z	CAP. CERAMIC	0.01		50V
C037	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C038	NO USE				
C039	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C040	CS15E1V100M	CAP. TANTALUM	10	20%	35V
C041	C91-1303-05	CAP. CERAMIC	0.1	10%	50V
C042	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C043	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C046	CE04EW1E100M	CAP. ELECTRO	10	20%	25V
C051	CC45FSL1H151J	CAP. CERAMIC	150P	5%	50V
C052	NO USE				
C053	CE04EW1E100M	CAP. ELECTRO	10	20%	25V
C101	CC45FCH1H100D	CAP. CERAMIC	10P	0.5P	50V
C102	C91-1304-05	CAP. 3-TERMINAL	270P	20%	100V
C103	CC45FCH1H470J	CAP. CERAMIC	47P	5%	50V
C104	CC45FSL1H271J	CAP. CERAMIC	270P	5%	50V
C105	CQ92FM1H104K	CAP. MYLAR	0.1	10%	50V
C106	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C107	CE04EW1E100M	CAP. ELECTRO	10	20%	25V
C108	CC45CH1H820J	CAP. CERAMIC	82P	5%	50V
C109	C91-0574-05	CAP. MYLAR	1	5%	100V
C110	CC45FCH1H120J	CAP. CERAMIC	12P	5%	50V
C111	CE04EW1E100M	CAP. ELECTRO	10	20%	25V
C112	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C113	CC45FSL1H221J	CAP. CERAMIC	220P	5%	50V
C114	CE04EW1H010M	CAP. ELECTRO	1	20%	50V
C115	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C116	CQ92FM1H683K	CAP. MYLAR	0.068	10%	50V
C117	CQ92FM1H472K	CAP. MYLAR	4700P	10%	50V
C118	CE04EW1H010M	CAP. ELECTRO	1	20%	50V
C119	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C120	CK45FB1H102K	CAP. CERAMIC	1000P	10%	50V
C121	CC45FCH1H470J	CAP. CERAMIC	47P	5%	50V
C122	CE04EW1E100M	CAP. ELECTRO	10	20%	25V
C123	CE04EW1E100M	CAP. ELECTRO	10	20%	25V
C124	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C125	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C126	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C127	CE04EW1E100M	CAP. ELECTRO	10	20%	25V
C128	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C129	CS15E1C3R3M	CAP. TANTALUM	3.3	20%	16V
C130	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C201	C91-1304-05	CAP. 3-TERMINAL	270P	20%	100V
C202	CC45FSL1H271J	CAP. CERAMIC	270P	5%	50V
C203	CS15E1C3R3M	CAP. TANTALUM	3.3	20%	16V
C204	CQ92FM1H104K	CAP. MYLAR	0.1	10%	50V
C205	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C206	CE04EW1E100M	CAP. ELECTRO	10	20%	25V
C207	CC45CH1H820J	CAP. CERAMIC	82P	5%	50V
C208	C91-0574-05	CAP. MYLAR	1	5%	100V
C209	CC45FCH1H050C	CAP. CERAMIC	5P	0.25P	50V
C210	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C211	CC45FCH1H120J	CAP. CERAMIC	12P	5%	50V
C212	CE04EW1E100M	CAP. ELECTRO	10	20%	25V
C213	CC45FCH1H470J	CAP. CERAMIC	47P	5%	50V
C214	CC45FCH1H050C	CAP. CERAMIC	5P	0.25P	50V
C215	CC45FCH1H100D	CAP. CERAMIC	10P	0.5P	50V
C216	CE04BW1C100M	CAP. ELECTRO	10	20%	16V
C217	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C218	NO USE				
C219	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C220	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C221	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C222	CC45FSL1H151J	CAP. CERAMIC	150P	5%	50V
C223	CC45FSL1H471J	CAP. CERAMIC	470P	5%	50V
C224	CE04EW1E100M	CAP. ELECTRO	10	20%	25V
C225	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C226	CE04EW1E100M	CAP. ELECTRO	10	20%	25V
C227	CE04EW1E100M	CAP. ELECTRO	10	20%	25V
C228	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C229	C91-0769-05	CAP. AXIAL	0.01	20%	16V
C230	CC45FSL1H271J	CAP. CERAMIC	270P	5%	50V
C231	CE04EW1E100M	CAP. ELECTRO	10	20%	25V
C232	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C233	CE04EW1E100M	CAP. ELECTRO	10	20%	25V
C401	CK45F1H103Z	CAP. CERAMIC	0.01		50V
C402	CC45FSL1H561J	CAP. CERAMIC	560P	5%	50V
C403	CE04EW1E100M	CAP. ELECTRO	10	20%	25V
C404	CE04EW1E100M	CAP. ELECTRO	10	20%	25V
C405	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C406	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C407	C91-1309-05	CAP. CERAMIC	0.01	10%	500V
C408	C91-1266-05	CAP. CERAMIC	1000P		6KV
C409	C91-1266-05	CAP. CERAMIC	1000P		6KV
C410	C91-1266-05	CAP. CERAMIC	1000P		6KV
C411	C91-1309-05	CAP. CERAMIC	0.01	10%	500V
C412	C91-1266-05	CAP. CERAMIC	1000P		6KV
C413	C91-1266-05	CAP. CERAMIC	1000P		6KV
C414	C91-1267-05	CAP. CERAMIC	4700P		3KV
C415	C91-1309-05	CAP. CERAMIC	0.01	10%	500V
C416	C91-1267-05	CAP. CERAMIC	4700P		3KV
C417	CE04EW1H010M	CAP. ELECTRO	1	20%	50V
C418	CK45FB1H222K	CAP. CERAMIC	2200P	10%	50V
C419	CQ92FM1H104K	CAP. MYLAR	0.1	10%	50V
C420	NO USE				
C421	CE04EW1E101M	CAP. ELECTRO	100	20%	25V
C422	C91-1264-05	CAP. CERAMIC	22P		3KV
C423	C91-1267-05	CAP. CERAMIC	4700P		3KV
C424	C91-1267-05	CAP. CERAMIC	4700P		3KV
C425	C91-1267-05	CAP. CERAMIC	4700P		3KV
C426	CE04W2C010M	CAP. ELECTRO	1	20%	160V
C427	CE04W2C100M	CAP. ELECTRO	10	20%	160V
C428	C91-1309-05	CAP. CERAMIC	0.01	10%	500V
C429	CK45FF1H103Z	CAP. CERAMIC	0.01		50V
C430	C91-1309-05	CAP. CERAMIC	0.01	10%	500V

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION			
C431	CQ92M1H104K	CAP. MYLAR	0.1	10%	50V
C432	CQ92FM1H104K	CAP. MYLAR	0.1	10%	50V
C433	CQ92FM1H104K	CAP. MYLAR	0.1	10%	50V
C434	CE04EW1E100M	CAP. ELECTRO	10	20%	25V
C435	C91-1309-05	CAP. CERAMIC	0.01	10%	500V
C436	CE04EW1E100M	CAP. ELECTRO	10	20%	25V
C801	CC45CH1H020C	CAP. CERAMIC	2P	0.25P	50V
C802	CC45SL1H681J	CAP. CERAMIC	680P	5%	50V
C803	CC45SL1H221J	CAP. CERAMIC	220P	5%	50V
C804	CC45SL1H271J	CAP. CERAMIC	270P	5%	50V
C805	CQ92M1H104K	CAP. MYLAR	0.1	10%	50V
C806	CE04EW1E100M	CAP. ELECTRO	10	20%	25V
C807	CE04EW1E100M	CAP. ELECTRO	10	20%	25V
C808	CC45SL1H561J	CAP. CERAMIC	560P	5%	50V
C809	CK45F1H103Z	CAP. CERAMIC	0.01		50V
C810	CK45F1H103Z	CAP. CERAMIC	0.01		50V
C811	CK45B1H102K	CAP. CERAMIC	1000P	10%	50V
C812	CQ92M1H104K	CAP. MYLAR	0.1	10%	50V
C901	CK45F1H103Z	CAP. CERAMIC	0.01		50V
C902	CK45F1H103Z	CAP. CERAMIC	0.01		50V
C903	CK45F1H103Z	CAP. CERAMIC	0.01		50V
C904	CK45F1H103Z	CAP. CERAMIC	0.01		50V
C905	CC45CH1H050C	CAP. CERAMIC	5P	0.25P	50V
C906	CC45CH1H030C	CAP. CERAMIC	3P	0.25P	50V
D001	1SS132	DIODE			
D002	1SS132	DIODE			
D003	1SS132	DIODE			
D004	1SS132	DIODE			
D005	1SS132	DIODE			
D006	1SS132	DIODE			
D007	HZS5.6J(B2)	DIODE, ZENER	5.62V		
D008	1SS86	DIODE			
D009	1SS132	DIODE			
D010	1SS132	DIODE			
D011	1SS132	DIODE			
D012	1SS132	DIODE			
D013	1SS132	DIODE			
D014	1SS132	DIODE			
D015	1SS132	DIODE			
D101	1SS132	DIODE			
D102	1SS132	DIODE			
D103	1SS132	DIODE			
D104	1SS132	DIODE			
D105	1SS132	DIODE			
D106	1SS132	DIODE			
D107	1SS132	DIODE			
D108	1SS132	DIODE			
D109	1SS132	DIODE			
D110	1SS132	DIODE			
D111	1SS132	DIODE			
D112	1SS132	DIODE			
D113	NO USE				
D114	1SS132	DIODE			
D115	1SS132	DIODE			
D116	1SS132	DIODE			
D117	1SS132	DIODE			
D201	1SS132	DIODE			
D202	1SS132	DIODE			
D203	1SS132	DIODE			
D204	1SS132	DIODE			
D205	1SS132	DIODE			
D206	1SS132	DIODE			
D207	1SS132	DIODE			
D208	1SS132	DIODE			
D209	1SS132	DIODE			
D210	1SS132	DIODE			
D211	1SS86	DIODE			
D212	1SS132	DIODE			
D213	1SS132	DIODE			
D214	1SS132	DIODE			
D215	1SS132	DIODE			
D216	1SS86	DIODE			
D217	1SS132	DIODE			
D218	1SS132	DIODE			
D219	1SS132	DIODE			
D220	1SS132	DIODE			
D221	1SS132	DIODE			
D222	1SS132	DIODE			
D402	HZ2(B3)	DIODE, ZENER	2.2V		
D403	1SS132	DIODE			
D404	1SS83	DIODE			
D405	1SS83	DIODE			
D406	1SS83	DIODE			

REF.NO	PARTS NO	NAME & DESCRIPTION	
D407	1SS83	DIODE	
D408	1SS83	DIODE	
D409	1SS83	DIODE	
D410	1SS83	DIODE	
D411	1SS83	DIODE	
D412	1SS132	DIODE	
D415	1SS132	DIODE	
D416	1SS132	DIODE	
D417	Y10GA	DIODE	
D424.	MTZ30JC	DIODE, ZENER	29.09V
D425	HZ36-2L	DIODE, ZENER	36.05V
D426	HZ36-2L	DIODE, ZENER	36.05V
D427	HZ36-2L	DIODE, ZENER	36.05V
D428	830-0957-05	LED (LN322GPT)	
D801	1SS132	DIODE	
J014	L40-2292-02	FERRI INDUCTOR	2.2UH 20%
JW001	E31-5659-05	LEAD WIRE WITH CONNECTOR	
JW002	E31-5660-05	LEAD WIRE WITH CONNECTOR	
JW007	E31-5671-05	LEAD WIRE WITH CONNECTOR	
JW014	E31-5672-05	LEAD WIRE WITH CONNECTOR	
JW039	E38-0025-05	LEAD WIRE WITH CONNECTOR	
JW040	E38-0025-05	LEAD WIRE WITH CONNECTOR	
JW902	E31-5719-05	LEAD WIRE WITH LUG	
L101	L40-2292-02	FERRI INDUCTOR	2.2UH 20%
L201	L40-2292-02	FERRI INDUCTOR	2.2UH 20%
L401	L40-1011-13	FERRI INDUCTOR	100UH 10%
L402	L40-2292-02	FERRI INDUCTOR	2.2UH 20%
L403	L40-2292-02	FERRI INDUCTOR	2.2UH 20%
L404	L40-2292-02	FERRI INDUCTOR	2.2UH 20%
NE401	NE-2B	NEON LAMP	
NE402	NE-2B	NEON LAMP	
P004	E40-0273-05	PIN CONNECTOR	2P
P005	E40-0273-05	PIN CONNECTOR	2P
P010	E40-0573-05	PIN CONNECTOR	5P
P022	E40-0673-05	PIN CONNECTOR	6P
P023	E23-0401-05	PIN TERMINAL	
P024	E40-0373-05	PIN CONNECTOR	3P
P025	E40-0573-05	PIN CONNECTOR	5P
P026	E40-0273-05	PIN CONNECTOR	2P
P027	E40-0273-05	PIN CONNECTOR	2P
P028	E40-0373-05	PIN CONNECTOR	3P
P029	NO USE		
P030	E40-0273-05	PIN CONNECTOR	2P
P031	E40-0373-05	PIN CONNECTOR	3P
P044	E40-7033-05	PIN CONNECTOR	2P
P045	E40-5331-05	PIN CONNECTOR	5P
P046	E40-0373-05	PIN CONNECTOR	3P
P047	E40-0273-05	PIN CONNECTOR	2P
P048	E40-0273-05	PIN CONNECTOR	2P
P049	E40-0273-05	PIN CONNECTOR	2P
P050	E40-0473-05	PIN CONNECTOR	4P
P051	E40-0273-05	PIN CONNECTOR	2P
P052	E40-0473-05	PIN CONNECTOR	4P
P053	E40-0273-05	PIN CONNECTOR	2P
P054	E23-0401-05	PIN TERMINAL	
P063	E23-0401-05	PIN TERMINAL	
P071	E40-0373-05	PIN CONNECTOR	3P
P801	E40-0216-05	PIN CONNECTOR	2P
Q001	2SA1206	TR. SI. PNP	
Q002	2SA1206	TR. SI. PNP	
Q003	2SC1907	TR. SI. NPN	
Q004	2SC1907	TR. SI. NPN	
Q005	2SK304(E)	FET. N-CHANNEL	
Q006	NO USE		
Q007	2SA1206	TR. SI. PNP	
Q008	2SA1206	TR. SI. PNP	
Q009	2SA838(B)	TR. SI. PNP	
Q010	2SA838(B)	TR. SI. PNP	
Q011	2SC945(Q)	TR. SI. NPN	

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION			
Q012	2SK117(BL)	FET. N-CHANNEL			
Q013	2SA1005(K)	TR. SI. PNP			
Q014	2SA1015(Y)	TR. SI. PNP			
Q015	2SC1907	TR. SI. NPN			
Q016	2SA1005(K)	TR. SI. PNP			
Q017	2SC1907	TR. SI. NPN			
Q018	2SC945(Q)	TR. SI. NPN			
Q019	2SC945(Q)	TR. SI. NPN			
Q020	2SC945(Q)	TR. SI. NPN			
Q021	2SA844(D)	TR. SI. PNP			
Q022	2SC945(Q)	TR. SI. NPN			
Q101	2SA844(D)	TR. SI. PNP			
Q102	2SA844(D)	TR. SI. PNP			
Q103	2SA844(D)	TR. SI. PNP			
Q104	2SA838(B)	TR. SI. PNP			
Q105	2SC1345(E)	TR. SI. NPN			
Q106	2SK170(V)	FET. N-CHANNEL			
Q107	2SK304(F)	FET. N-CHANNEL			
Q108	2SC1907	TR. SI. NPN			
Q109	2SA1015(Y)	TR. SI. PNP			
Q110	2SA844(D)	TR. SI. PNP			
Q111	2SA1175(F)	TR. SI. PNP			
Q112	2SC945(Q)	TR. SI. NPN			
Q113	2SC945(Q)	TR. SI. NPN			
Q114	2SC945(Q)	TR. SI. NPN			
Q201	2SA844(D)	TR. SI. PNP			
Q202	2SA844(D)	TR. SI. PNP			
Q203	2SA844(D)	TR. SI. PNP			
Q204	2SA838(B)	TR. SI. PNP			
Q205	2SC1345(E)	TR. SI. NPN			
Q206	2SK170(V)	FET. N-CHANNEL			
Q207	2SK304(F)	FET. N-CHANNEL			
Q208	2SC1907	TR. SI. NPN			
Q209	2SA1015(Y)	TR. SI. PNP			
Q210	2SA1015(Y)	TR. SI. PNP			
Q211	2SA844(D)	TR. SI. PNP			
Q212	2SC945(Q)	TR. SI. NPN			
Q213	UPA68H	TR. ARRAY			
Q214	2SC945(Q)	TR. SI. NPN			
Q215	2SA844(D)	TR. SI. PNP			
Q216	2SA844(D)	TR. SI. PNP			
Q217	2SC945(Q)	TR. SI. NPN			
Q218	2SA1005(K)	TR. SI. PNP			
Q219	2SA1005(K)	TR. SI. PNP			
Q220	2SC945(Q)	TR. SI. NPN			
Q221	2SC945(Q)	TR. SI. NPN			
Q401	2SA1005(K)	TR. SI. PNP			
Q402	2SA1005(K)	TR. SI. PNP			
Q403	2SC1907	TR. SI. NPN			
Q404	2SC1907	TR. SI. NPN			
Q405	2SD668A(C)	TR. SI. NPN			
Q406	2SD668A(C)	TR. SI. NPN			
Q407	2SD668A(C)	TR. SI. NPN			
Q408	2SD668A(C)	TR. SI. NPN			
Q409	2SD880(Y)	TR. SI. NPN			
Q410	2SC945(Q)	TR. SI. NPN			
Q411	2SA1015(Y)	TR. SI. PNP			
R001	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R002	RD14BB2C821J	RES. CARBON	820	5%	1/6W
R003	RD14BB2C182J	RES. CARBON	1.8K	5%	1/6W
R004	RD14BB2C471J	RES. CARBON	470	5%	1/6W
R005	RD14BB2C822J	RES. CARBON	8.2K	5%	1/6W
R006	RD14BB2C272J	RES. CARBON	2.7K	5%	1/6W
R007	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R008	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R009	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R010	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R011	RD14BB2C100J	RES. CARBON	10	5%	1/6W
R012	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R013	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R014	RN14BK2E1004F	RES. METAL FILM	1M	1%	1/4W
R015	RD14BB2C474J	RES. CARBON	470K	5%	1/6W
R016	RD14BB2C100J	RES. CARBON	10	5%	1/6W
R027	RD14BB2C122J	RES. CARBON	1.2K	5%	1/6W
R028	RD14BB2C122J	RES. CARBON	1.2K	5%	1/6W
R029	RD14BB2C151J	RES. CARBON	150	5%	1/6W
R030	RD14BB2C123J	RES. CARBON	12K	5%	1/6W
R031	RD14BB2C123J	RES. CARBON	12K	5%	1/6W
R032	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R033	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R034	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R035	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R036	RD14BB2C202J	RES. CARBON	2K	5%	1/6W
R037	RD14BB2C562J	RES. CARBON	5.6K	5%	1/6W
R040	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R041	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R042	RD14BB2C620J	RES. CARBON	62	5%	1/6W
R043	RD14BB2C272J	RES. CARBON	2.7K	5%	1/6W
R044	RD14BB2C272J	RES. CARBON	2.7K	5%	1/6W
R045	NO USE				
R046	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R047	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R048	RN14BK2C4700F	RES. METAL FILM	470	1%	1/6W
R049	RN14BK2C4700F	RES. METAL FILM	470	1%	1/6W
R050	RD14BB2C331J	RES. CARBON	330	5%	1/6W
R051	RD14BB2C331J	RES. CARBON	330	5%	1/6W
R052	RD14BB2C562J	RES. CARBON	5.6K	5%	1/6W
R053	RD14BB2C562J	RES. CARBON	5.6K	5%	1/6W
R054	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R055	NO USE				
R056	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R057	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R058	RD14BB2C105J	RES. CARBON	1M	5%	1/6W
R059	RD14BB2C105J	RES. CARBON	1M	5%	1/6W
R060	RD14BB2C105J	RES. CARBON	1M	5%	1/6W
R061	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R062	RD14BB2C682J	RES. CARBON	6.8K	5%	1/6W
R063	RD14BB2C224J	RES. CARBON	220K	5%	1/6W
R064	RD14BB2C152J	RES. CARBON	1.5K	5%	1/6W
R065	L40-1091-03	FERRI INDUCTOR	1UH		
R066	RD14BB2C680J	RES. CARBON	68	5%	1/6W
R067	RD14BB2C331J	RES. CARBON	330	5%	1/6W
R068	RD14BB2E101J	RES. CARBON	100	5%	1/4W
R069	RD14BB2C183J	RES. CARBON	18K	5%	1/6W
R070	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R071	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R072	RD14BB2C474J	RES. CARBON	470K	5%	1/6W
R073	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R074	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R075	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R076	RD14BB2E102J	RES. CARBON	1K	5%	1/4W
R077	RD14BB2C331J	RES. CARBON	330	5%	1/6W
R078	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R079	RD14BB2C330J	RES. CARBON	33	5%	1/6W
R080	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R081	RD14BB2C681J	RES. CARBON	680	5%	1/6W
R082	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R083	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R084	RD14BB2C123J	RES. CARBON	12K	5%	1/6W
R085	RD14BB2C562J	RES. CARBON	5.6K	5%	1/6W
R086	RD14BB2C331J	RES. CARBON	330	5%	1/6W
R087	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R088	RD14BB2C271J	RES. CARBON	270	5%	1/6W
R089	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R090	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R091	RD14BB2C561J	RES. CARBON	560	5%	1/6W
R092	RD14BB2C181J	RES. CARBON	180	5%	1/6W
R093	RD14BB2C272J	RES. CARBON	2.7K	5%	1/6W
R094	RD14BB2C272J	RES. CARBON	2.7K	5%	1/6W
R095	RD14BB2C152J	RES. CARBON	1.5K	5%	1/6W
R096	RD14BB2C911J	RES. CARBON	910	5%	1/6W
R097	RD14BB2C682J	RES. CARBON	6.8K	5%	1/6W
R098	RD14BB2C562J	RES. CARBON	5.6K	5%	1/6W
R099	RD14BB2C333J	RES. CARBON	33K	5%	1/6W
R100	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R101	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R102	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R103	RD14BB2C181J	RES. CARBON	180	5%	1/6W
R104	RD14BB2E151J	RES. CARBON	150	5%	1/4W
R105	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R106	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R107	RD14BB2C152J	RES. CARBON	1.5K	5%	1/6W
R108	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R109	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R110	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R111	RD14BB2C331J	RES. CARBON	330	5%	1/6W
R112	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R113	RD14BB2C680J	RES. CARBON	68	5%	1/6W
R114	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R115	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R116	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R117	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R118	RD14BB2C392J	RES. CARBON	3.9K	5%	1/6W
R119	RD14BB2C183J	RES. CARBON	18K	5%	1/6W
R120	RD14BB2C121J	RES. CARBON	120	5%	1/6W
R121	RN14BK2C2201F	RES. METAL FILM	2.2K	1%	1/6W
R122	RD14BB2C272J	RES. CARBON	2.7K	5%	1/6W
R123	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R124	RD14BB2C123J	RES. CARBON	12K	5%	1/6W
R125	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R126	RN14BK2E3004F	RES. METAL FILM	3M	1%	1/4W
R127	RN14BK2C1004F	RES. METAL FILM	1M	1%	1/6W
R128	RN14BK2C5003F	RES. METAL FILM	500K	1%	1/6W
R129	RN14BK2C3003F	RES. METAL FILM	300K	1%	1/6W

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION			
R130	RN14BK2C1003F	RES. METAL FILM	100K	1%	1/6W
R131	RN14BK2C5002F	RES. METAL FILM	50K	1%	1/6W
R132	RN14BK2C3002F	RES. METAL FILM	30K	1%	1/6W
R133	RN14BK2C1002F	RES. METAL FILM	10K	1%	1/6W
R134	RN14BK2C5001F	RES. METAL FILM	5K	1%	1/6W
R135	RN14BK2C3001F	RES. METAL FILM	3K	1%	1/6W
R136	RN14BK2C1001F	RES. METAL FILM	1K	1%	1/6W
R137	RN14BK2C1001F	RES. METAL FILM	1K	1%	1/6W
R138	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R139	RD14BB2C561J	RES. CARBON	560	5%	1/6W
R140	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R141	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R142	RD14BB2C821J	RES. CARBON	820	5%	1/6W
R143	RD14BB2C562J	RES. CARBON	5.6K	5%	1/6W
R144	RD14BB2C561J	RES. CARBON	560	5%	1/6W
R145	RD14BB2E101J	RES. CARBON	100	5%	1/4W
R146	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R147	RD14BB2C680J	RES. CARBON	68	5%	1/6W
R148	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R149	RD14BB2C822J	RES. CARBON	8.2K	5%	1/6W
R150	RD14BB2E102J	RES. CARBON	1K	5%	1/4W
R151	RD14BB2C682J	RES. CARBON	6.8K	5%	1/6W
R152	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R153	RD14BB2C180J	RES. CARBON	18	5%	1/6W
R154	RD14BB2C100J	RES. CARBON	10	5%	1/6W
R155	RD14BB2E100J	RES. CARBON	10	5%	1/4W
R156	RD14BB2C100J	RES. CARBON	10	5%	1/6W
R157	RN14BK2C2102F	RES. METAL FILM	21K	1%	1/6W
R158	RN14BK2C3002F	RES. METAL FILM	30K	1%	1/6W
R201	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R202	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R203	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R204	RD14BB2C181J	RES. CARBON	180	5%	1/6W
R205	RD14BB2C151J	RES. CARBON	150	5%	1/6W
R206	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R207	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R208	RD14BB2C152J	RES. CARBON	1.5K	5%	1/6W
R209	RD14BB2C331J	RES. CARBON	330	5%	1/6W
R210	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R211	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R212	RD14BB2C680J	RES. CARBON	68	5%	1/6W
R213	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R214	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R215	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R216	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R217	RD14BB2C392J	RES. CARBON	3.9K	5%	1/6W
R218	RD14BB2C183J	RES. CARBON	18K	5%	1/6W
R219	RD14BB2C121J	RES. CARBON	120	5%	1/6W
R220	RN14BK2C2201F	RES. METAL FILM	2.2K	1%	1/6W
R221	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R222	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R223	RN14BK2C1202F	RES. METAL FILM	12K	1%	1/6W
R224	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R225	RN14BK2E3004F	RES. METAL FILM	3M	1%	1/4W
R226	RN14BK2C1004F	RES. METAL FILM	1M	1%	1/6W
R227	RN14BK2C5003F	RES. METAL FILM	500K	1%	1/6W
R228	RN14BK2C3003F	RES. METAL FILM	300K	1%	1/6W
R229	RN14BK2C1003F	RES. METAL FILM	100K	1%	1/6W
R230	RN14BK2C5002F	RES. METAL FILM	50K	1%	1/6W
R231	RN14BK2C3002F	RES. METAL FILM	30K	1%	1/6W
R232	RN14BK2C1002F	RES. METAL FILM	10K	1%	1/6W
R233	RN14BK2C5001F	RES. METAL FILM	5K	1%	1/6W
R234	RN14BK2C3001F	RES. METAL FILM	3K	1%	1/6W
R235	RN14BK2C1001F	RES. METAL FILM	1K	1%	1/6W
R236	RN14BK2C1001F	RES. METAL FILM	1K	1%	1/6W
R237	RN14BK2C2202F	RES. METAL FILM	22K	1%	1/6W
R238	RN14BK2C3002F	RES. METAL FILM	30K	1%	1/6W
R239	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R240	RD14BB2C471J	RES. CARBON	470	5%	1/6W
R241	RD14BB2C153J	RES. CARBON	15K	5%	1/6W
R242	RD14BB2C822J	RES. CARBON	8.2K	5%	1/6W
R243	RD14BB2C152J	RES. CARBON	1.5K	5%	1/6W
R244	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R245	RD14BB2C822J	RES. CARBON	8.2K	5%	1/6W
R246	RD14BB2C242J	RES. CARBON	2.4K	5%	1/6W
R247	RD14BB2C563J	RES. CARBON	56K	5%	1/6W
R248	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R249	RD14BB2C561J	RES. CARBON	560	5%	1/6W
R250	RD14BB2C561J	RES. CARBON	560	5%	1/6W
R251	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R252	RN14BK2C1801F	RES. METAL FILM	1.8K	1%	1/6W
R253	RD14BB2C561J	RES. CARBON	560	5%	1/6W
R254	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R255	RD14BB2E470J	RES. CARBON	47	5%	1/4W
R256	RD14BB2C562J	RES. CARBON	5.6K	5%	1/6W
R257	RD14BB2C682J	RES. CARBON	6.8K	5%	1/6W
R258	RD14BB2E470J	RES. CARBON	47	5%	1/4W
R259	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R260	RD14BB2C682J	RES. CARBON	6.8K	5%	1/6W

REF.NO	PARTS NO	NAME & DESCRIPTION			
R261	RD14BB2C471J	RES. CARBON	470	5%	1/6W
R262	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R263	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R264	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R265	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R266	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R267	RD14BB2C181J	RES. CARBON	180	5%	1/6W
R268	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R269	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R270	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R271	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R272	RD14BB2C100J	RES. CARBON	10	5%	1/6W
R273	RD14BB2E151J	RES. CARBON	150	5%	1/4W
R274	RD14BB2E181J	RES. CARBON	180	5%	1/4W
R275	RD14BB2C100J	RES. CARBON	10	5%	1/6W
R276	RD14BB2C151J	RES. CARBON	150	5%	1/6W
R277	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R278	RD14BB2E103J	RES. CARBON	10K	5%	1/4W
R401	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R402	RD14BB2C561J	RES. CARBON	560	5%	1/6W
R403	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R404	RD14BB2C123J	RES. CARBON	12K	5%	1/6W
R405	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R406	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R407	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R408	RD14BB2C331J	RES. CARBON	330	5%	1/6W
R409	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R410	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R411	RD14BB2C682J	RES. CARBON	6.8K	5%	1/6W
R412	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R413	RD14BB2C201J	RES. CARBON	200	5%	1/6W
R414	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R415	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R416	RD14DB2H473J	RES. CARBON	47K	5%	1/2W
R417	RS14GB3A333J	RES. METAL FILM	33K	5%	1W
R418	RD14BB2C561J	RES. CARBON	560	5%	1/6W
R419	RD14BB2C681J	RES. CARBON	680	5%	1/6W
R420	RS14GB3A223J	RES. METAL FILM	22K	5%	1W
R421	RD14DB2H473J	RES. CARBON	47K	5%	1/2W
R422	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R423	RD14BB2E101J	RES. CARBON	100	5%	1/4W
R424	R92-1057-05	RES. METAL FILM	2.2M	5%	1/2W
R425	R92-1007-05	RES. CARBON	10M	5%	1/2W
R426	R92-1007-05	RES. CARBON	10M	5%	1/2W
R427	RD14BB2E102J	RES. CARBON	1K	5%	1/4W
R428	RD14BB2E102J	RES. CARBON	1K	5%	1/4W
R429	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R430	R92-1057-05	RES. METAL FILM	2.2M	5%	1/2W
R431	RD14BB2E101J	RES. CARBON	100	5%	1/4W
R432	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R433	R92-1057-05	RES. METAL FILM	2.2M	5%	1/2W
R434	R92-1007-05	RES. CARBON	10M	5%	1/2W
R435	R92-1007-05	RES. CARBON	10M	5%	1/2W
R436	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R437	R92-1418-05	RES. METAL	6.8M	1%	1W
R438	R92-1419-05	RES. METAL FILM	10M	1%	1W
R439	RD14BB2C471J	RES. CARBON	470	5%	1/6W
R440	RN14BK2C1203F	RES. METAL FILM	120K	1%	1/6W
R441	RD14BB2C152J	RES. CARBON	1.5K	5%	1/6W
R454	RN14BK2C1002F	RES. METAL FILM	10K	1%	1/6W
R455	RD14BB2C393J	RES. CARBON	39K	5%	1/6W
R456	RN14BK2C1202F	RES. METAL FILM	12K	1%	1/6W
R457	NO USE				
R458	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R459	NO USE				
R460	RS14GB3A1R0J	RES. METAL FILM	1	5%	1W
R461	RD14BB2E223J	RES. CARBON	22K	5%	1/4W
R462	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R463	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R464	RD14BB2C681J	RES. CARBON	680	5%	1/6W
R465	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R466	RS14GB3A101J	RES. METAL FILM	100	5%	1W
R467	RS14GB3A101J	RES. METAL FILM	100	5%	1W
R468	RS14GB3A102J	RES. METAL FILM	1K	5%	1W
R469	RD14BB2C561J	RES. CARBON	560	5%	1/6W
R801	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R802	RD14BB2C121J	RES. CARBON	120	5%	1/6W
R803	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R804	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R901	RD14BB2C331J	RES. CARBON	330	5%	1/6W
R902	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R905	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R906	RN14BK2C4301F	RES. METAL FILM	4.3K	1%	1/6W
R907	RN14BK2C4301F	RES. METAL FILM	4.3K	1%	1/6W

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION	
S001	S33-2501-05	LEVER SWITCH 2-5	
S002	S33-2501-05	LEVER SWITCH 2-5	
S101	S33-4503-05	LEVER SWITCH 4-5 (H.MODE)	
S102	S29-4503-05	ROTARY SWITCH WITH V.R.	
S201	S29-4503-05	ROTARY SWITCH WITH V.R.	
S202	S32-4009-05	LEVER SWITCH 4-4	
T401	L19-0421-05	CONVERTOR TRANSFORMER	
TC101	C05-0454-05	CAP. TRIMMER	20PF
TC201	C05-0454-05	CAP. TRIMMER	20PF
U001	CA3127E	IC. TR. ARRAY NPN	
U002	TL081CP	IC. BI-FET O.P AMP	
U003	SN74F00N	IC. QUAD 2-INPUT NAND GATE	
U101	SN74LS00N	IC. QUAD 2 INPUT NAND	
U102	SN74F74N	IC. DUAL D-FLIP-FLOP	
U103	TL081CP	IC. BI-FET O.P AMP	
U104	TC4053BP	IC. 2-CH ANALOG MULTIPLEXER	
U201	SN74F74N	IC. DUAL D-FLIP-FLOP	
U202	TL081CP	IC. BI-FET O.P AMP	
U203	SN74LS112AN	IC. DUAL JK-FF	
U401	LF13741N	IC. MONOLITHIC JFET INPUT OP	
VR001	R12-0577-05	RES. SEMI FIXED	500 B
VR002	R12-2522-05	RES. SEMI FIXED	5K B
VR003	R12-0576-05	RES. SEMI FIXED	200 B
VR004	R12-0576-05	RES. SEMI FIXED	200 B
VR101	R12-3549-05	RES. SEMI FIXED	10K B
VR102	R06-3502-05	V.R.	10K B
VR201	R12-3549-05	RES. SEMI FIXED	10K B
VR202	R12-3550-05	RES. SEMI FIXED	20K B
VR203	R12-1545-05	RES. SEMI FIXED	1K B
VR204	R12-1545-05	RES. SEMI FIXED	1K B
VR401	R12-4516-05	RES. SEMI FIXED	50K B
VR402	R12-8501-05	RES. SEMI FIXED	2.2M B
W001	W02-0474-05	HIGH VOLTAGE BLOCK	

LINE FILTER UNIT

(X80-1060-05)

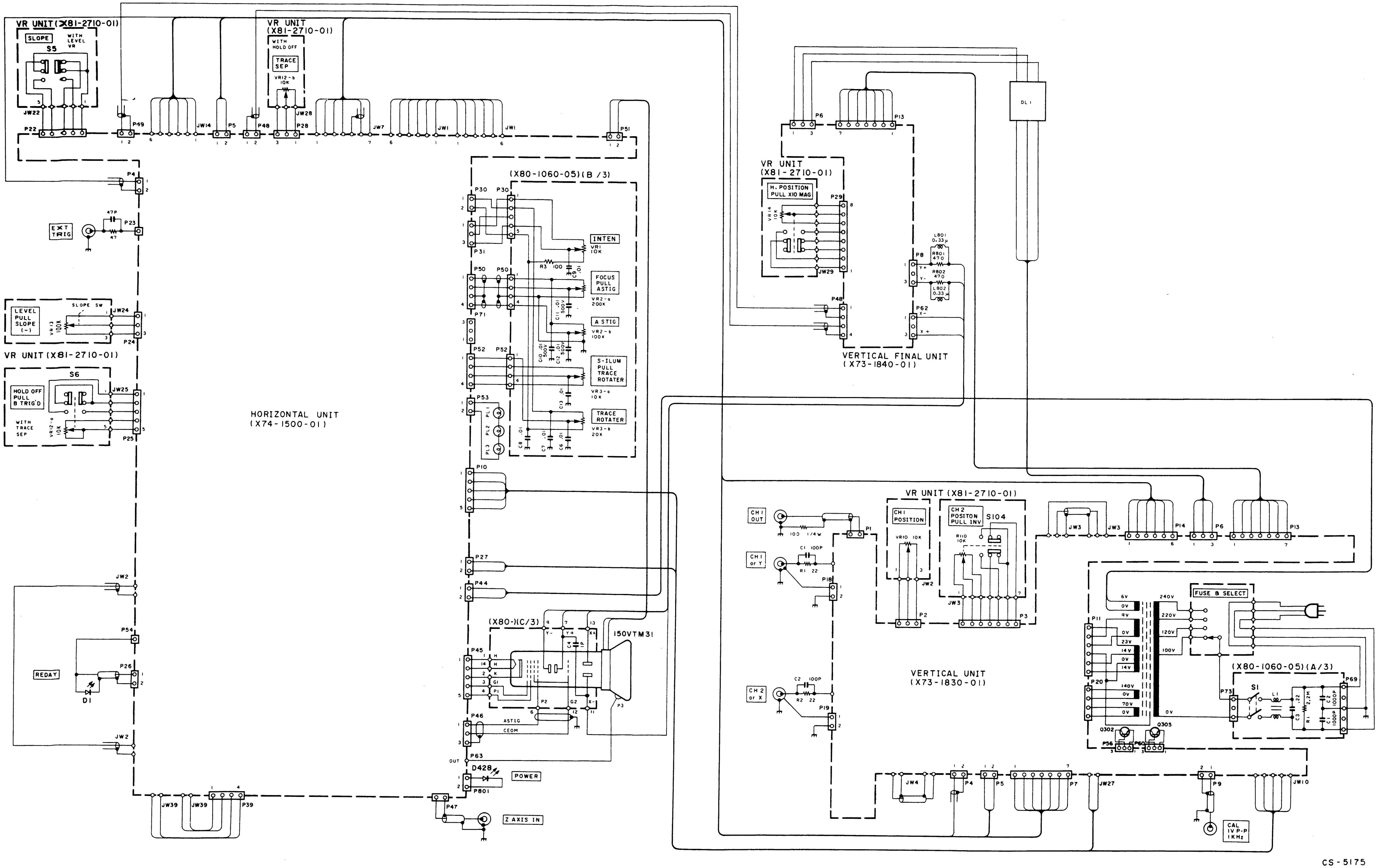
REF.NO	PARTS NO	NAME & DESCRIPTION			
	E01-0103-05	CRT SOCKET			
	E31-5532-15	WIRE ASS'Y (P1.G1.K)			
	E31-5674-05	WIRE ASS'Y (P2.K2)			
	E31-5675-15	WIRE ASS'Y (+X.-X)			
	E31-5676-15	WIRE ASS'Y (P2.K2)			
	J25-5179-33	PCB (UNMOUNTED)			
	R92-0150-05	JUMPING RES.	ZERO OHM(10MM)		
	R92-1061-05	JUMPING RES.	ZERO OHM (5MM)		
C001	C91-0575-05	CAP. CERAMIC	1000P		4KV
C002	C91-0575-05	CAP. CERAMIC	1000P		4KV
C003	C91-0551-05	CAP. POLYESTER	0.22	10%	630V
C004	CC45CH2H010C	CAP. CERAMIC	1P	0.25P	500V
C005	NO USE				
C006	CK45F1H103Z	CAP. CERAMIC	0.01		50V
C007	CK45F1H103Z	CAP. CERAMIC	0.01		50V
C008	CK45F1H103Z	CAP. CERAMIC	0.01		50V
C009	CK45F1H103Z	CAP. CERAMIC	0.01		50V
C010	C91-1309-05	CAP. CERAMIC	0.01	10%	500V
C011	C91-1309-05	CAP. CERAMIC	0.01	10%	500V
C012	C91-1309-05	CAP. CERAMIC	0.01	10%	500V
C013	CK45F1H103Z	CAP. CERAMIC	0.01		50V
L001	L33-0808-05	CHOKE COIL			
L801	L40-3381-70	FERRI INDUCTOR	0.33UH	10%	
L802	L40-3381-70	FERRI INDUCTOR	0.33UH	10%	
P030	E40-0574-05	PIN CONNECTOR	5P		
P050	E40-0474-05	PIN CONNECTOR	4P		
P051	NO USE				
P052	E40-0474-05	PIN CONNECTOR	4P		
P069	E40-0530-05	PIN CONNECTOR	5P		
P073	E40-0330-05	PIN CONNECTOR	3P		
R001	RD14BY2H225J	RES. CARBON	2.2M	5%	1/2W
R002	NO USE				
R003	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R801	RD14BB2C471J	RES. CARBON	470	5%	1/6W
R802	RD14BB2C471J	RES. CARBON	470	5%	1/6W
S001	S40-2524-05	PUSH SWITCH (POWER)			
VR001	R05-3513-05	V.R.(INTEN) 10KB			
VR002	R10-9506-05	V.R.(FOCUS/ASTIG) 200KB/100KB			
VR003	R10-9507-05	V.R.(ILLUM/ROTA) 10KB/20KB			

VR UNIT

(X81-2710-01)

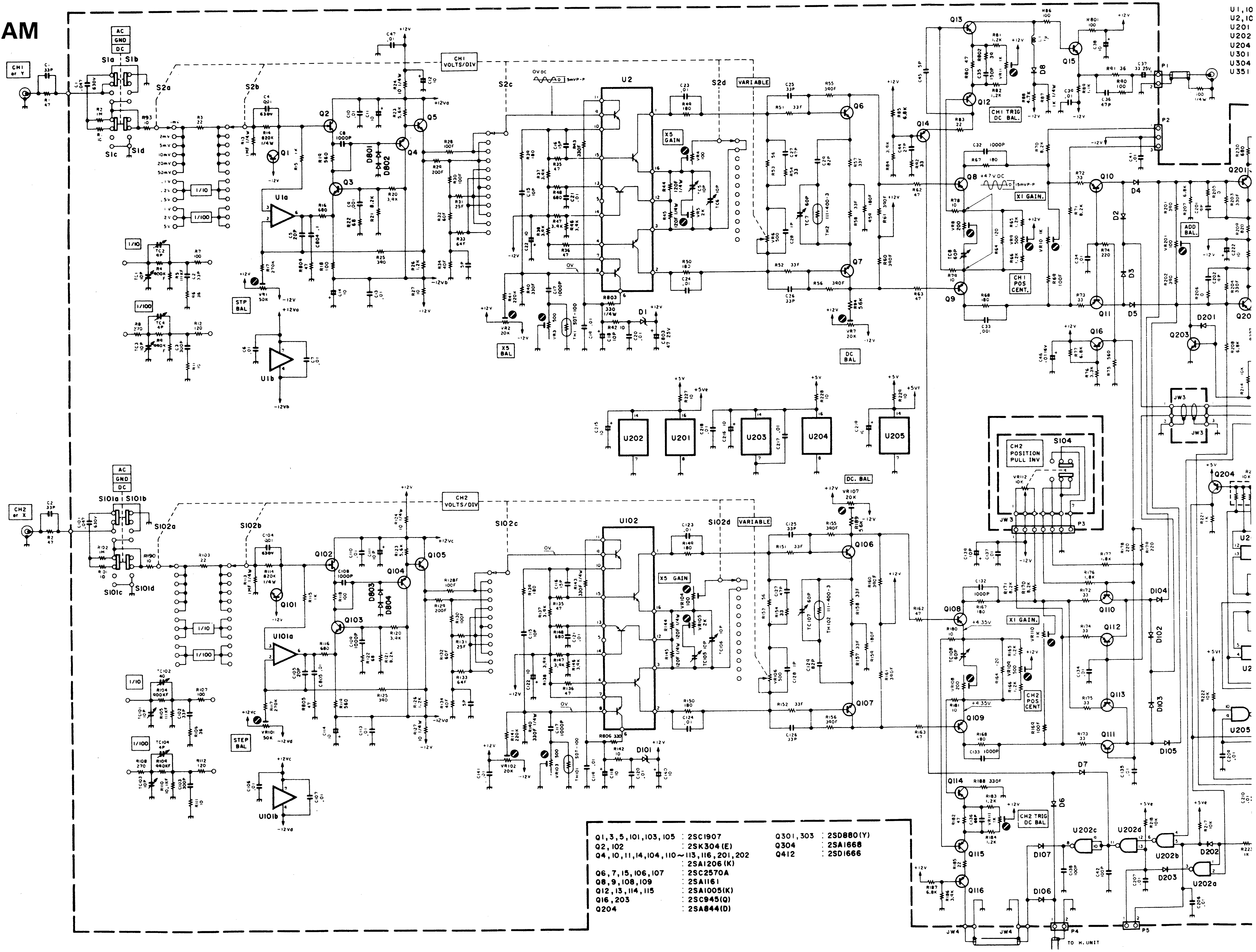
REF.NO	PARTS NO	NAME & DESCRIPTION	
	J25-5354-03	PCB (UNMOUNTED)	
JW002	E31-5503-05	LEAD WIRE WITH CONNECTOR	
JW003	E31-5722-05	LEAD WIRE WITH CONNECTOR	
JW022	E31-5721-05	LEAD WIRE WITH CONNECTOR	
JW023	NO USE		
JW024	E31-5518-05	LEAD WIRE WITH CONNECTOR	
JW025	E31-5520-05	LEAD WIRE WITH CONNECTOR	
JW028	E31-5522-05	LEAD WIRE WITH CONNECTOR	
JW029	E31-5677-15	LEAD WIRE WITH CONNECTOR	
VR010	R01-3522-05	V.R.	2X10K B
VR011	NO USE		
VR012	R06-2505-05	VR WITH SWITCH	2X10K B
VR013	R01-5513-05	VR WITH SWITCH	100K B
VR014	R01-3523-05	VR WITH SWITCH	10K B
VR110	R01-3523-05	VR WITH SWITCH	10K B

SCHEMATIC DIAGRAM


VR UNIT (X81-2710-01)
SLOPE
WITH LEVEL VR
S5
JW22
P22
P49
JW14
P5
P48
VR UNIT (X81-2710-01)
WITH HOLD OFF
TRACE SEP
VR12-b 10K
JW28
P28
JW7
JW1
JW1
P51
P4
EXT TRIG
47P
47
P23
LEVEL PULL SLOPE (-)
SLOPE SW
VR13 100K
JW24
P24
VR UNIT (X81-2710-01)
S6
HOLD OFF PULL B TRIG'D
WITH TRACE SEP
VR12-a 10K
JW25
P25
HORIZONTAL UNIT (X74-1500-01)
JW2
P54
P26
REDAY
D1
JW2
JW39
JW39
P39
P47
Z AXIS IN
(X80-1060-05) (B/3)
P30
P30
P31
INTEN
VR1 10K
R3 100
C9 .01
P50
P50
FOCUS PULL ASTIG
VR2-a 200K
C11 .01 500V
P71
A STIG
VR2-b 100K
P52
P52
C10 .01 500V
C12 .01 500V
S-ILUM PULL TRACE ROTATER
VR3-a 10K
P53
PL1
PL2
PL3
C13 .01
TRACE ROTATER
VR3-b 20K
C8 .01
C7 .01
C6 .01
P10
P27
P44
(X80-)(C/3)
Y-
Y+
X+
X-
C4 1P
150VTM31
P45
H
H
K
G1
P1
P2
G2
P3
P46
ASTIG
CEOM
OUT
P63
D428
POWER
P801
VR UNIT (X81-2710-01)
P6
P13
H. POSITION PULL X10 MAG
VR14 10K
P29
JW29
DL1
L801 0.33μ
R801 470
R802 470
L802 0.33μ
P8
Y+
Y-
P48
P62
X-
X+
VERTICAL FINAL UNIT (X73-1840-01)
CH1 OUT
100 1/4W
P1
VR UNIT (X81-2710-01)
CH1 POSITION
VR10 10K
CH2 POSITON PULL INV
S104
R110 10K
JW2
JW3
P2
P3
JW3
JW3
P14
P6
P13
CH1 or Y
C1 100P
R1 22
P18
CH2 or X
C2 100P
R2 22
P19
VERTICAL UNIT (X73-1830-01)
P11
P20
6V
0V
9V
0V
23V
14V
0V
14V
140V
0V
70V
0V
240V
220V
120V
100V
0V
FUSE & SELECT
(X80-1060-05) (A/3)
P73
S1
L1
C3 .22
R1 2.2M
C 1000P
C 1000P
P69
Q302
Q303
P56
P60
JW4
P4
P5
P7
JW27
P9
JW10
CAL 1V P-P 1KHz

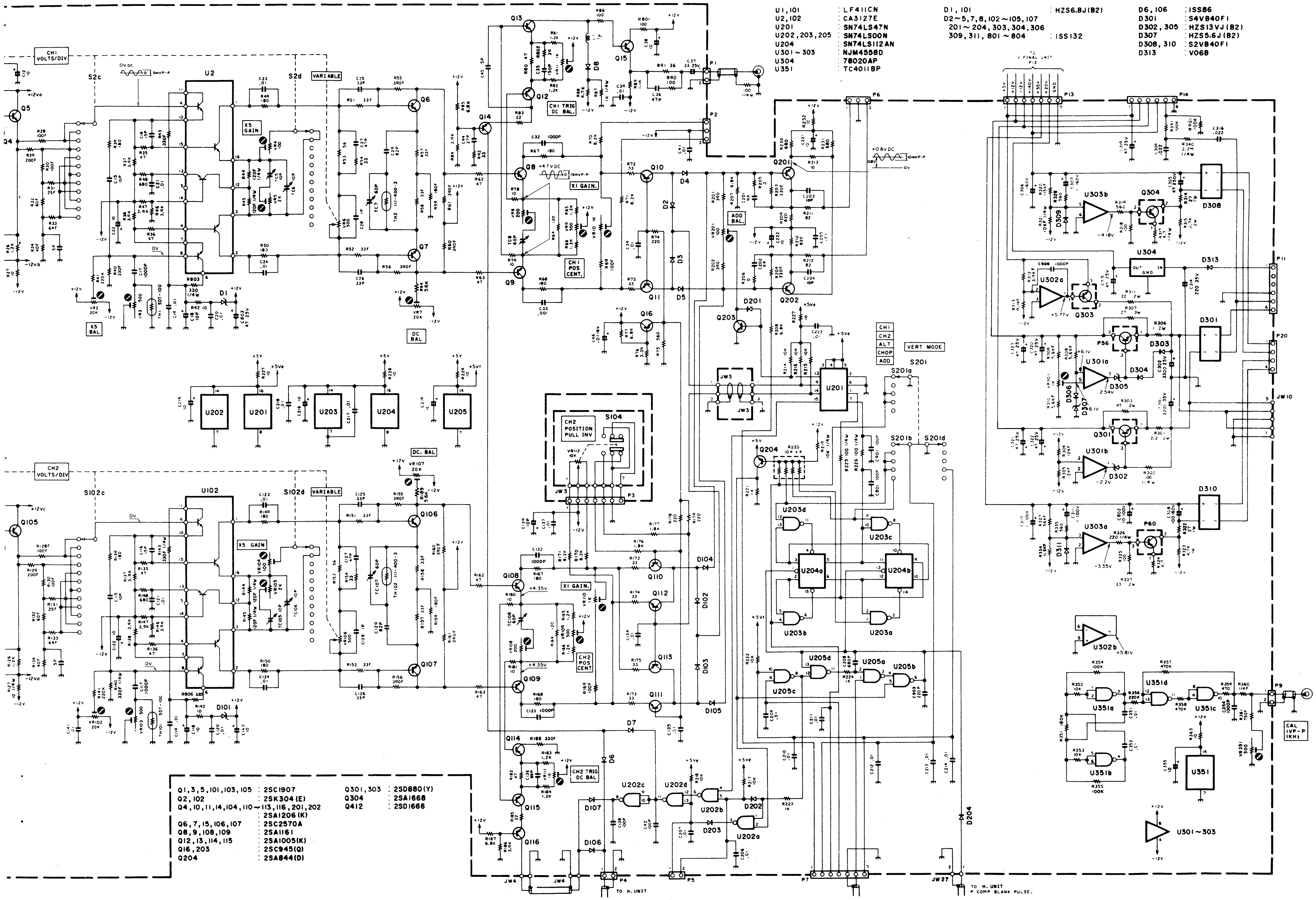
SCHEMATIC DIAGRAM

VERTICAL UNIT (X73-1830-01)


CH1 or Y
CH2 or X
AC
GND
DC
S1a
S1b
S1c
S1d
S2a
S2b
S2c
S2d
S101a
S101b
S101c
S101d
S102a
S102b
S102c
S102d
CH1 VOLTS/DIV
CH2 VOLTS/DIV
VARIABLE
1/10
1/100
STP BAL
STEP BAL
X5 BAL
X5 GAIN
DC BAL
CH1 TRIG DC BAL
CH2 TRIG DC BAL
X1 GAIN
CH1 POS CENT
CH2 POS CENT
ADD BAL
CH2 POSITION PULL INV
S104
U1a
U1b
U101a
U101b
U2
U102
U201
U202
U203
U204
U205
U202a
U202b
U202c
U202d
JW3
JW4
P1
P2
P3
P4
P5
TO H. UNIT
+12V
-12V
+5V
U1,10
U2,10
U201
U202
U204
U301
U304
U351

Q1,3,5,101,103,105 : 2SC1907
Q2,102 : 2SK304(E)
Q4,10,11,14,104,110～113,116,201,202
: 2SA1206(K)
Q6,7,15,106,107 : 2SC2570A
Q8,9,108,109 : 2SA1161
Q12,13,114,115 : 2SA1005(K)
Q16,203 : 2SC945(Q)
Q204 : 2SA844(D)

Q301,303 : 2SD880(Y)
Q304 : 2SA1668
Q412 : 2SD1666


CH1 VOLTS/DIV
S2c
S2d
U2
VARIABLE
X5 GAIN
X5 BAL
DC BAL
CH1 TRIG DC BAL.
X1 GAIN.
CH1 POS CENT.
ADD BAL.
CH2 VOLTS/DIV
S102c
S102d
U102
CH2 POSITION PULL INV
S104
DC. BAL
CH2 POS CENT
CH2 TRIG DC BAL
CH1
CH2
ALT
CHOP
ADD
VERT MODE
S201
TO V FINAL UNIT P13
TO H. UNIT
TO H. UNIT P COMP BLANK PULSE.
CAL 1VP-P 1KHz
U301~303

U1,101 : LF411CN
U2,102 : CA3127E
U201 : SN74LS47N
U202,203,205 : SN74LS00N
U204 : SN74LS112AN
U301~303 : NJM4558D
U304 : 78020AP
U351 : TC4011BP

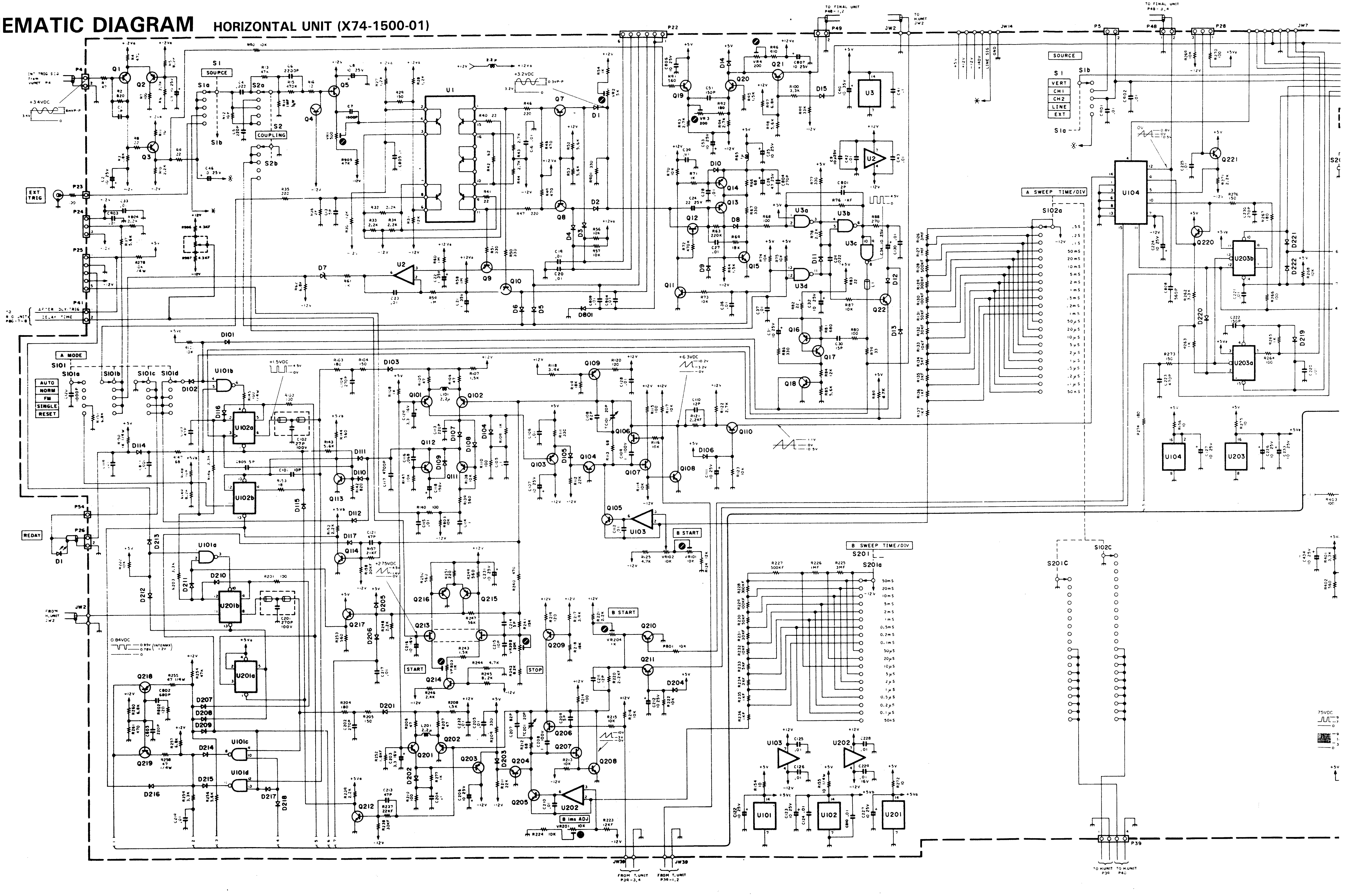
D1,101 : HZS6.8J(B2)
D2~5,7,8,102~105,107
201~204,303,304,306
309,311,801~804 : ISS132

D6,106 : ISS86
D301 : S4VB40F1
D302,305 : HZS13VJ(B2)
D307 : HZS5.6J(B2)
D308,310 : S2VB40F1
D313 : V06B

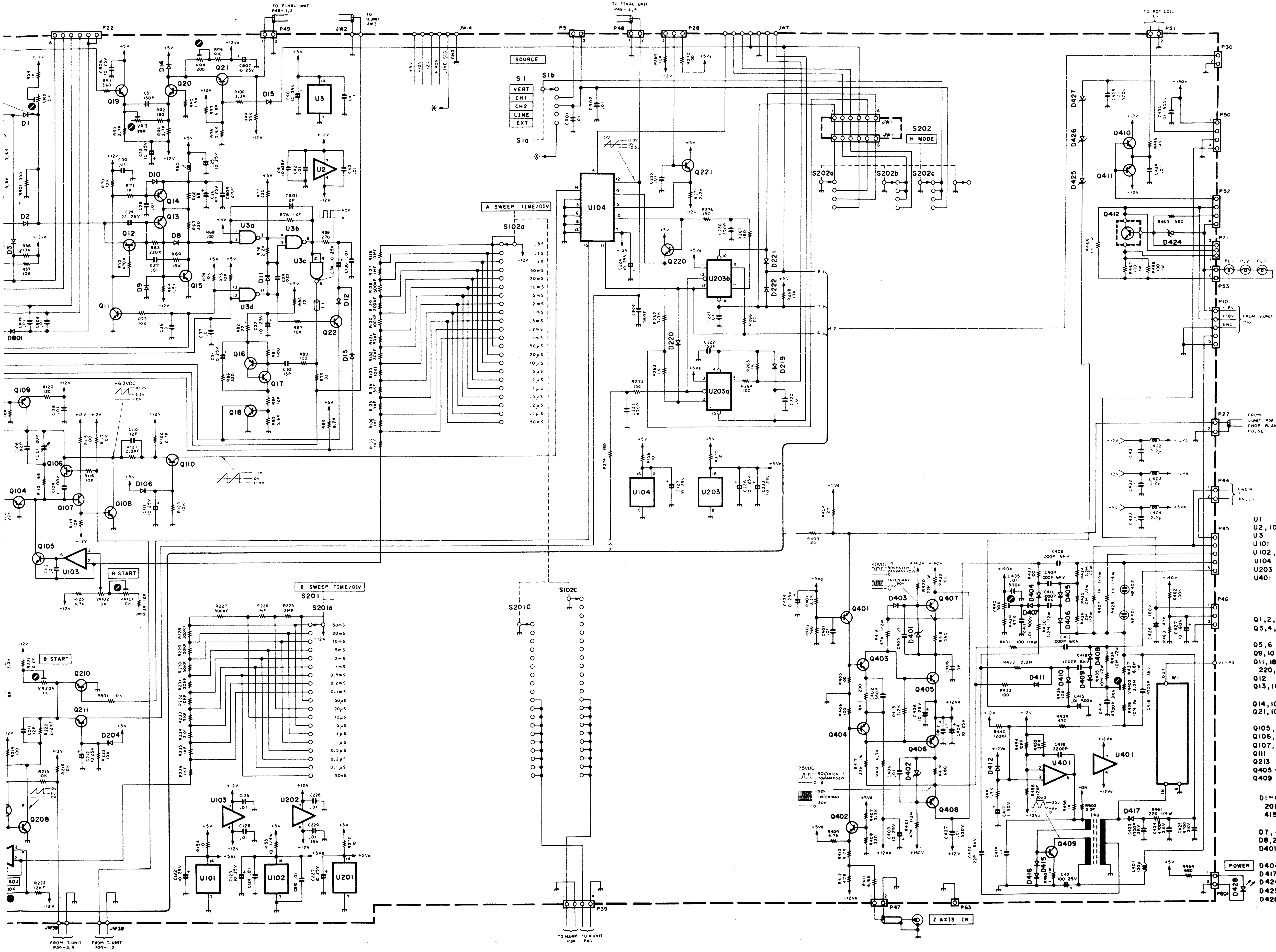
Q1,3,5,101,103,105 : 2SC1907
Q2,102 : 2SK304(E)
Q4,10,11,14,104,110~113,116,201,202 : 2SA1206(K)
Q6,7,15,106,107 : 2SC2570A
Q8,9,108,109 : 2SA1161
Q12,13,114,115 : 2SA1005(K)
Q16,203 : 2SC945(Q)
Q204 : 2SA844(D)

Q301,303 : 2SD880(Y)
Q304 : 2SA1668
Q412 : 2SD1666

SCHEMATIC DIAGRAM HORIZONTAL UNIT (X74-1500-01)



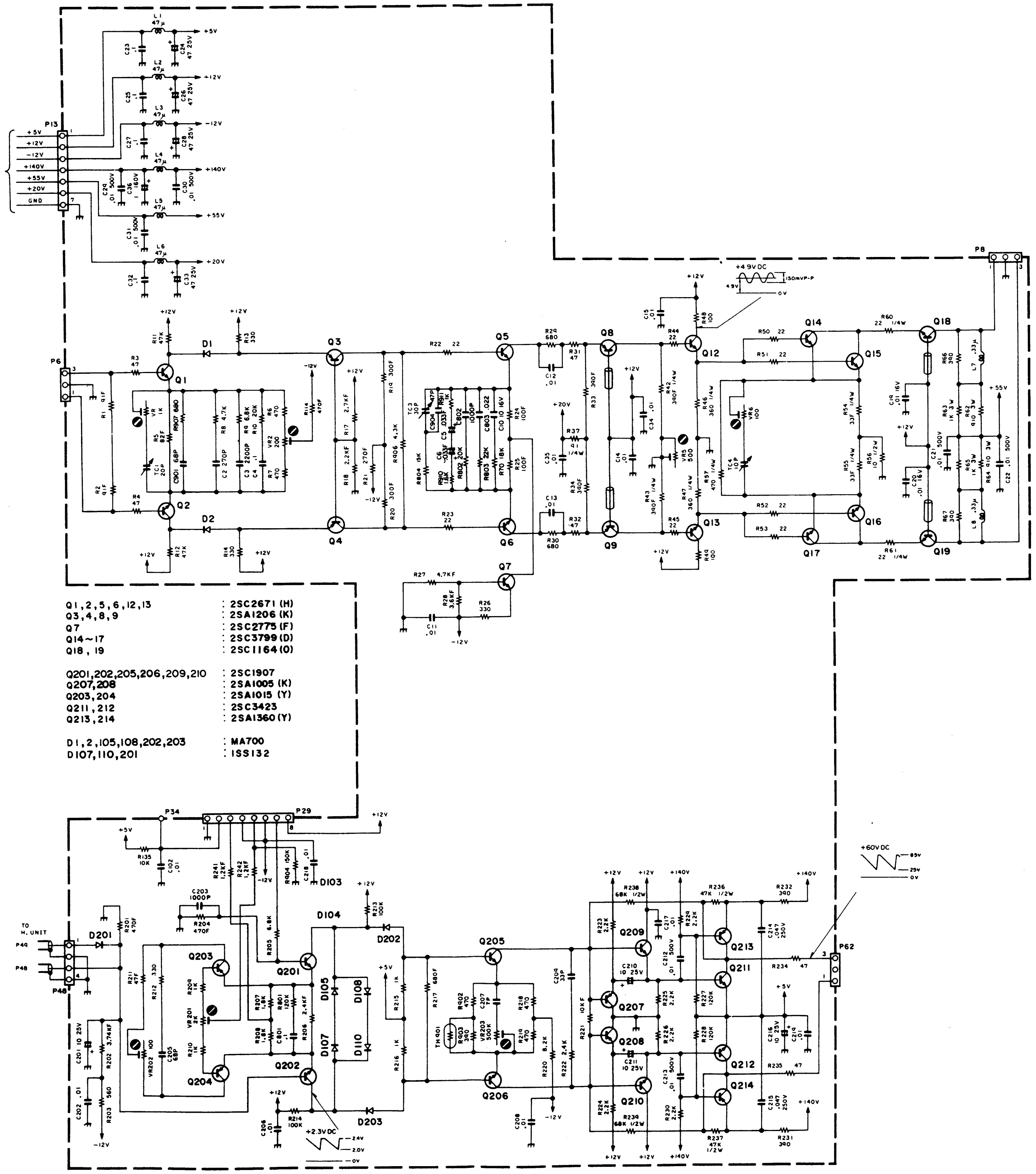
S1 SOURCE
S1a
S1b
S2a
S2b
S2 COUPLING
EXT TRIG
P4
P22
P23
P24
P25
P41
P49
P5
P48
P28
JW2
JW14
JW7
TO FINAL UNIT P48-1,2
TO FINAL UNIT P48-3,4
TO H UNIT JW2
INT TRIG SIG from V UNIT P4
+3.4VDC
+3.2VDC
AFTER DLY TRIG
DELAY TIME
A MODE
S101
S101a
S101b
S101c
S101d
AUTO
NORM
FM
SINGLE
RESET
READY
P54
P26
D1
FROM H UNIT JW2
SOURCE
VERT
CH1
CH2
LINE
EXT
A SWEEP TIME/DIV
S102a
B SWEEP TIME/DIV
S201
S201a
S201C
S102C
B START
START
STOP
B 1ms ADJ
U1
U2
U3
U3a
U3b
U3c
U3d
U101a
U101b
U101c
U101d
U102a
U102b
U103
U104
U201a
U201b
U202
U203a
U203b
U101
U102
U201
U203
JW38
JW39
FROM T UNIT P38-3,4
FROM T UNIT P38-1,2
P39
TO H UNIT P30
TO H UNIT P40
+1.5VDC
+6.3VDC
+2.75VDC
0.84VDC


SOURCE
S1
VERT
CH1
CH2
LINE
EXT
S1a
S1b
S202
H MODE
S202a
S202b
S202c
JW1
A SWEEP TIME/DIV
S102a
B SWEEP TIME/DIV
S201
S201a
S201C
S102c
B START
Z AXIS IN
POWER
P22
P49
JW2
JW14
P5
P48
P28
JW7
P51
P30
P50
P52
P71
P53
P10
P27
P44
P45
P46
P39
P47
P63
P801
JW38
JW39
TO FINAL UNIT P48-1,2
TO H.UNIT JW2
TO FINAL UNIT P48-3,4
TO POT CCT.
FROM V.UNIT P10
FROM V.UNIT P28 CHOP BLANK PULSE
FROM T.UNIT P39-3,4
FROM T.UNIT P39-1,2
TO H.UNIT P39
TO H.UNIT P40
U104
U203b
U203a
U3a
U3b
U3c
U3d
U2
U3
U103
U202
U101
U102
U201
U401
W1
T401

U1	: CA3127E
U2, 103, 202	: TL081CP
U3	: SN74F00N
U101	: SN74LS00N
U102, 201	: SN74F74N
U104	: TC4053BP
U203	: 74LS112AN
U401	: LF13741N
Q1, 2, 7, 8	: 2SA1206
Q3, 4, 15, 17, 108, 208, 403, 404	: 2SC1907
Q5, 6	: 2SK304(E)
Q9, 10, 104, 204	: 2SA838(B)
Q11, 18~20, 22, 112~114, 212, 214, 217 220, 221, 410	: 2SC945(Q)
Q12	: 2SK117(BL)
Q13, 16, 218, 219, 401, 402	: 2SA1005(K)
Q14, 109, 209, 210, 411	: 2SA1015(Y)
Q21, 101~103, 110, 201~203, 211, 215, 216	: 2SA844(D)
Q105, 205	: 2SC1345(E)
Q106, 206	: 2SK170(V)
Q107, 207	: 2SK304(F)
Q111	: 2SA1175(F)
Q213	: μPA68H
Q405 ~ 408	: 2SD668A(C)
Q409,	: 2SD880(Y)
D1~6, 9, 10~15, 101~112, 114~117, 201~210, 212~215, 217~222, 403, 412, 415, 416, 801,	: 1SS132
D7, 413	: HZS5.6J(B2)
D8, 211, 216	: 1SS86
D401, 402	: HZ2(B3)
D404 ~ 411	: 1SS83
D417	: Y10GA
D424	: MTZ30JC
D425 ~ 427	: HZ36-2L
D428	: B30-0957-05

SCHEMATIC DIAGRAM

VERTICAL FINAL UNIT (X73-1840-01)


P13
+5V
+12V
−12V
+140V
+55V
+20V
GND
P6
P8
P34
P29
P48
P62
TO H. UNIT
P44
P48
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q12
Q13
Q14
Q15
Q16
Q17
Q18
Q19
D1
D2
Q201
Q202
Q203
Q204
Q205
Q206
Q207
Q208
Q209
Q210
Q211
Q212
Q213
Q214
D103
D104
D105
D107
D108
D110
D201
D202
D203
+4.9V DC
+60V DC
+2.3V DC

Q1,2,5,6,12,13 : 2SC2671 (H)
Q3,4,8,9 : 2SA1206 (K)
Q7 : 2SC2775 (F)
Q14~17 : 2SC3799 (D)
Q18, 19 : 2SC1164 (O)

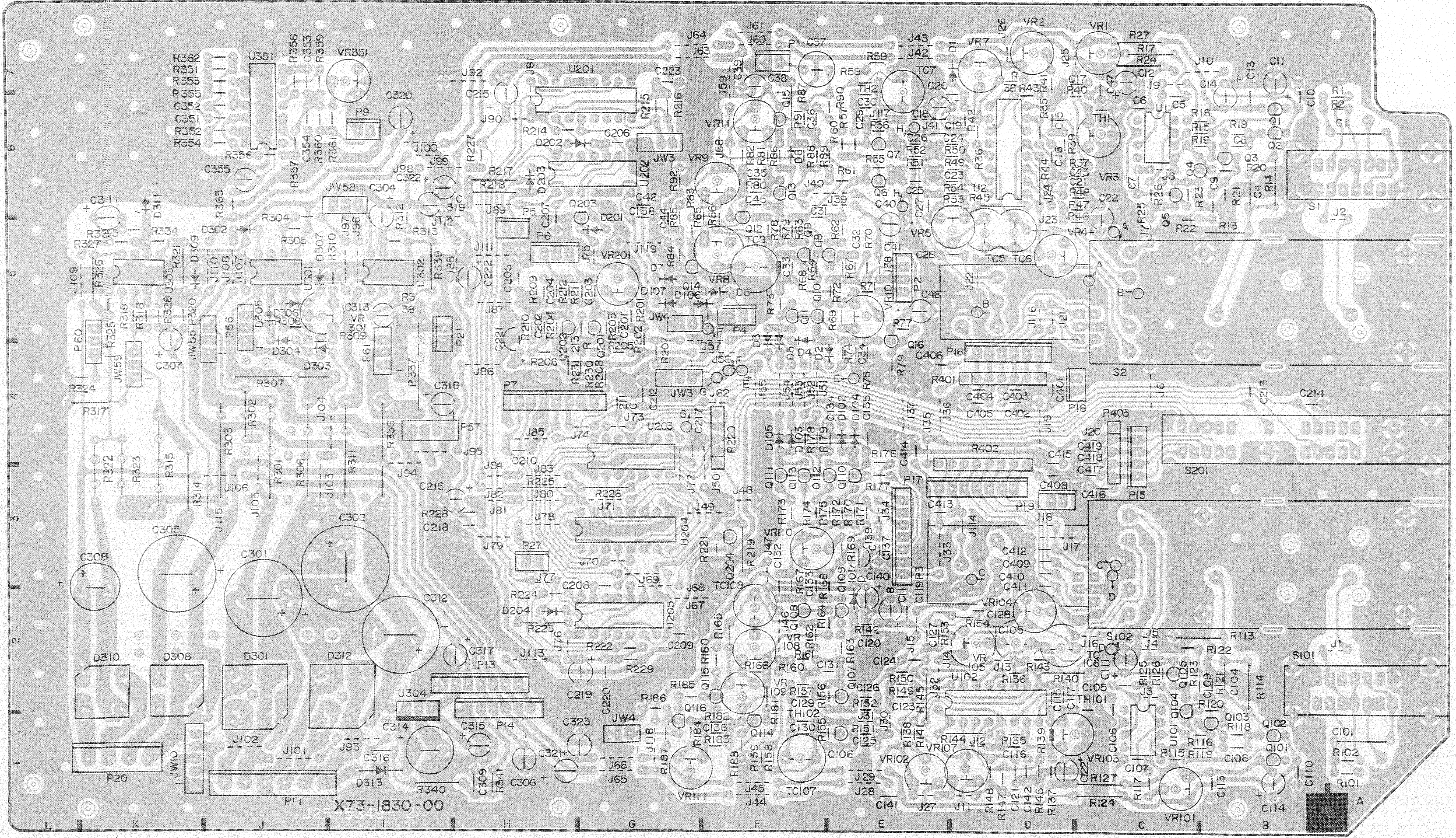
Q201,202,205,206,209,210 : 2SC1907
Q207,208 : 2SA1005 (K)
Q203,204 : 2SA1015 (Y)
Q211,212 : 2SC3423
Q213,214 : 2SA1360 (Y)

D1,2,105,108,202,203 : MA700
D107,110,201 : 1SS132

P.C. BOARD

VERTICAL UNIT (X73-1830-01)

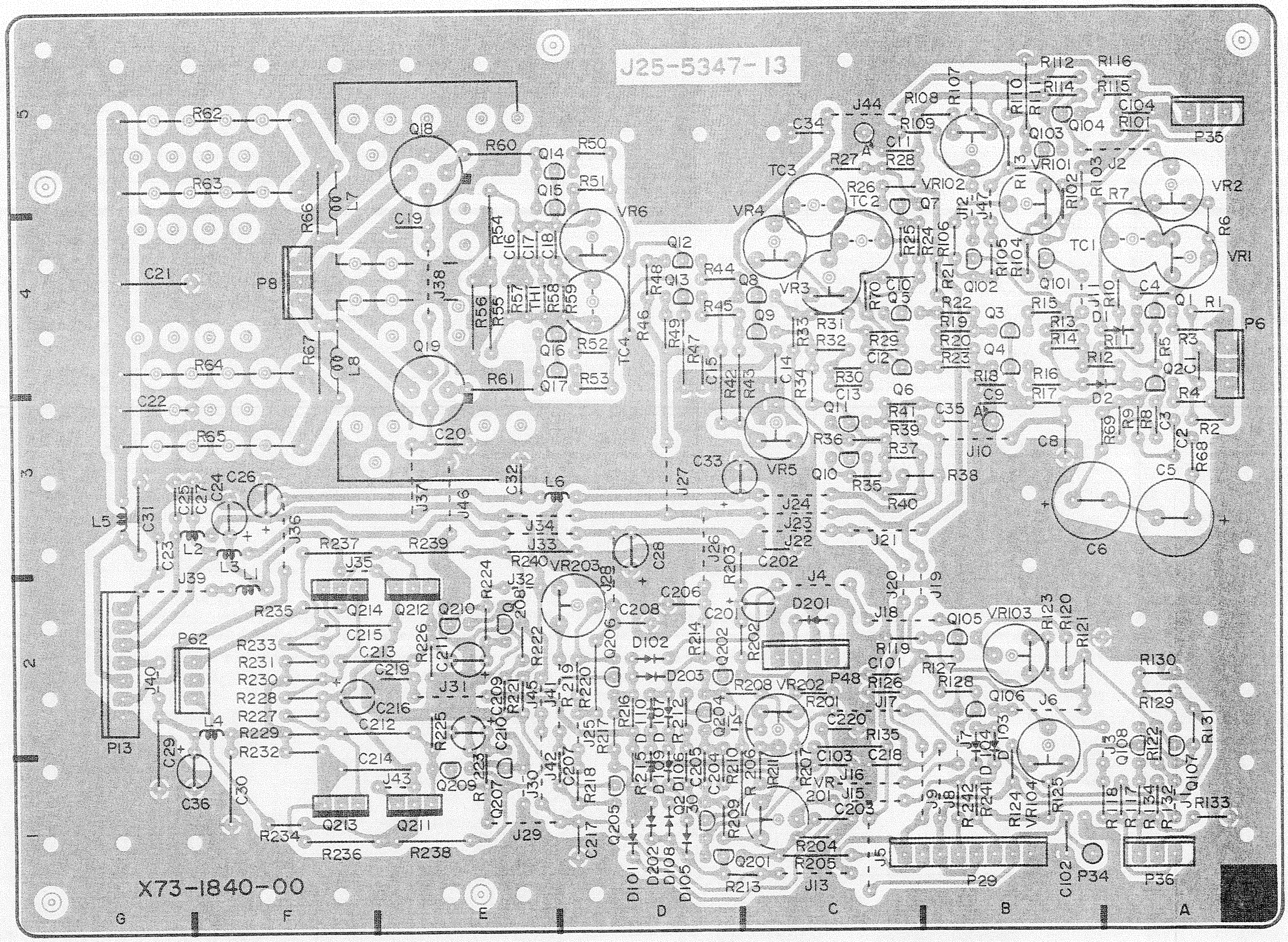
Pattern side view


X73-1830-00
U351
VR351
C320
P9
U201
U202
JW3
JW4
JW58
U301
U302
U303
VR201
VR1
VR2
VR3
VR4
VR5
VR7
VR8
VR9
VR10
VR11
TC3
TC5
TC6
TC7
TH1
TH2
S1
S2
S201
S101
S102
J1
J2
P2
P4
P5
P6
P7
P11
P13
P14
P15
P16
P17
P18
P19
P20
P21
P27
P56
P57
P60
P61
U203
U204
U205
U304
U1
U2
U101
U102
C301
C302
C305
C308
C312
D301
D308
D310
D312
D313
JW10
JW55
JW59
VR101
VR102
VR103
VR104
VR105
VR106
VR107
VR110
VR111
TC105
TC106
TC107
TC108
THI101
THI102
R401
R402
R403
C401
C402
C403
C404
C405
L
K
J
I
H
G
F
E
D
C
B
A
1
2
3
4
5
6

P.C. BOARD

VERTICAL FINAL UNIT (X73-1840-01)

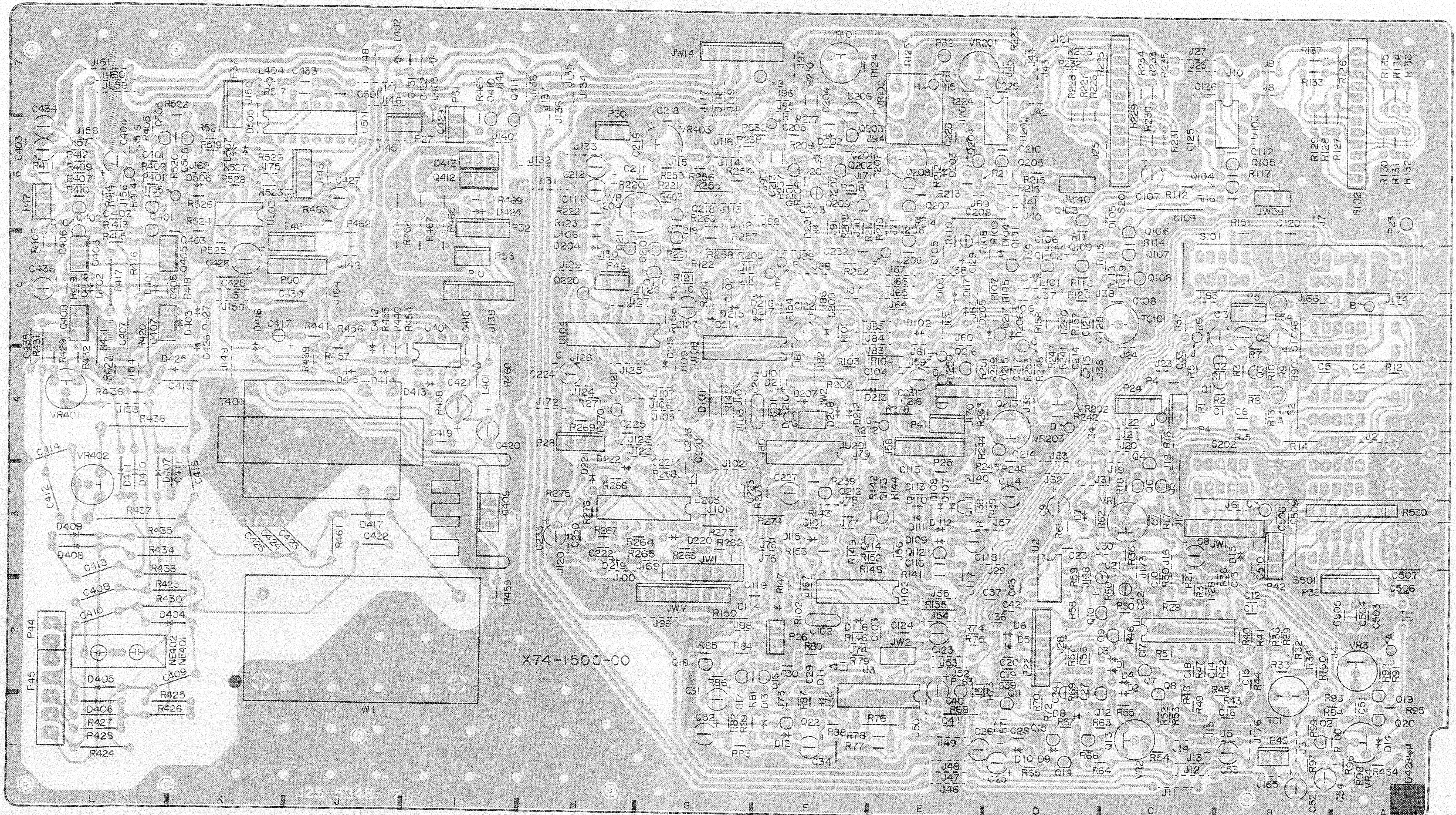
Pattern side view


J25-5347-13
X73-1840-00
G
F
E
D
C
B
A
5
4
3
2
1
P6
P8
P13
P29
P34
P35
P36
P48
P62
VR1
VR2
VR3
VR4
VR5
VR6
TC1
TC2
TC3
TC4
Q18
Q19
C5
C6

P.C. BOARD

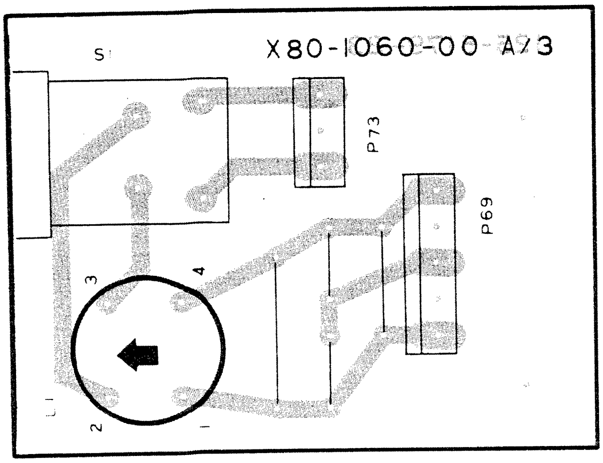
HORIZONTAL UNIT (X74-1500-01)

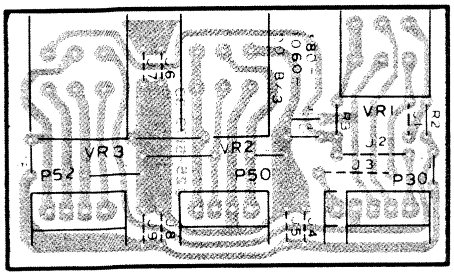
Pattern side view

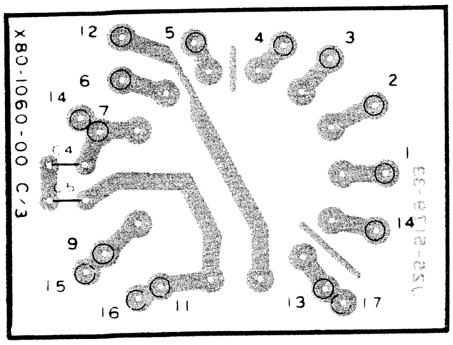

X74-1500-00
J25-5348-12
T401
W1
VR401
VR402
VR1
VR2
VR3
VR101
VR201
VR202
VR203
U401
U501
U101
U102
U103
U201
U202
U203
S101
S201
S202
S501
JW1
JW2
JW7
JW14
JW39
JW40
1
2
3
4
5
6
7
L
K
J
I
H
G
F
E
D
C
B
A

P.C. BOARD

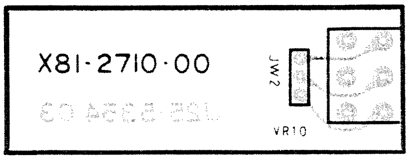
LINE FILTER UNIT (X80-1060-05)

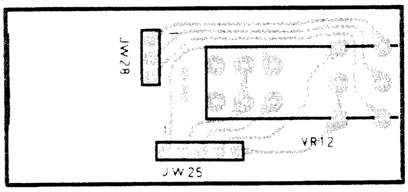

X80-1060-00 A/3
S1
P73
P69
L1
1
2
3
4

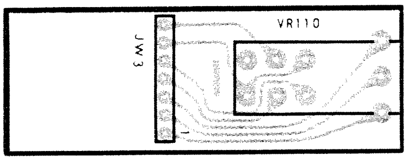

X80-1060-00 B/3
VR3
VR2
VR1
P52
P50
P30
R2
J2
J3

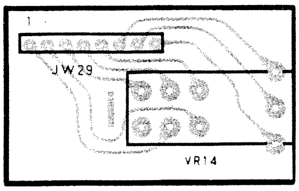

X80-1060-00 C/3
1
2
3
4
5
6
7
9
11
12
13
14
15
16
17

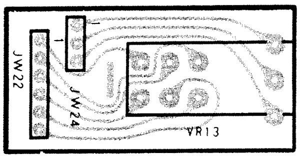
VR UNIT (X81-2710-01)


X81-2710-00
JW2
VR10

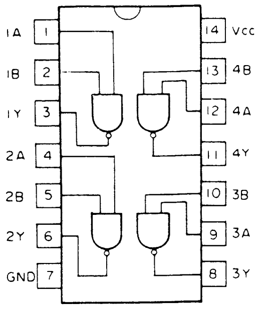

JW28
VR12
JW25



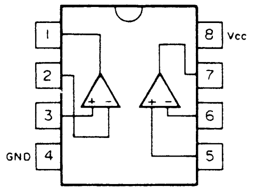



JW22
JW24
1
VR13

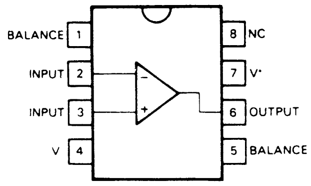
SEMICONDUCTORS


1A
1B
1Y
2A
2B
2Y
GND
Vcc
4B
4A
4Y
3B
3A
3Y

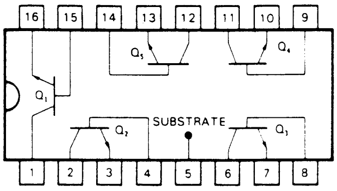
SN74FOON
SN74LSOON



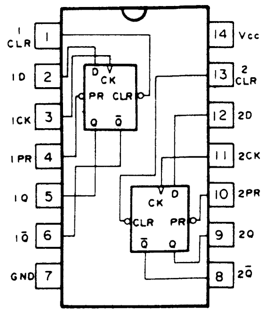
NJM4558D


BALANCE
INPUT
INPUT
V
NC
V+
OUTPUT
BALANCE

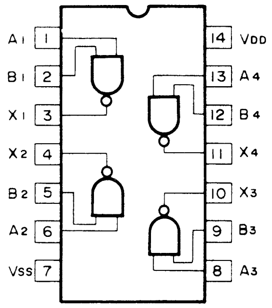
LF411CN


Q1
Q2
Q3
Q4
Q5
SUBSTRATE

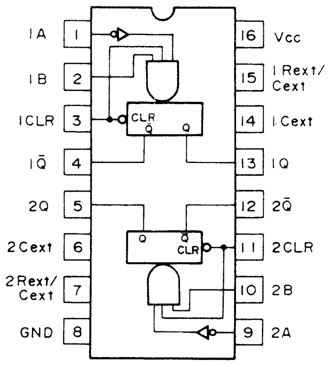
CA3127E


1 CLR
1D
1CK
1PR
1Q
1Q̄
GND
Vcc
2 CLR
2D
2CK
2PR
2Q
2Q̄

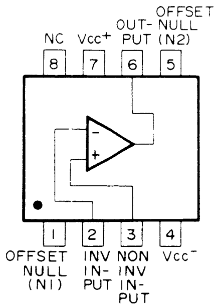
SN74F74N


A1
B1
X1
X2
B2
A2
Vss
VDD
A4
B4
X4
X3
B3
A3

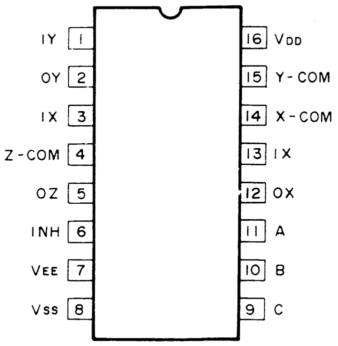
TC4011BP


1A
1B
1CLR
1Q̄
2Q
2Cext
2Rext/Cext
GND
Vcc
1Rext/Cext
1Cext
1Q
2Q̄
2CLR
2B
2A

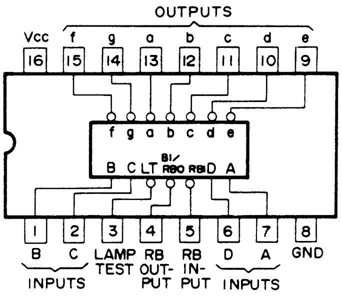
TC74HC123AP


NC
Vcc+
OUTPUT
OFFSET NULL (N2)
OFFSET NULL (N1)
INV INPUT
NON INV INPUT
Vcc−

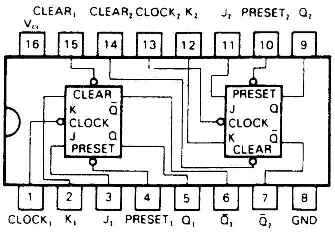
TC081CP


1Y
0Y
1X
Z-COM
0Z
INH
VEE
Vss
VDD
Y-COM
X-COM
1X
0X
A
B
C

TC4053BP

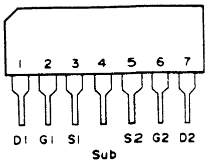

OUTPUTS
Vcc
f
g
a
b
c
d
e
B
C
LT
BI/RBO
RBI
D
A
B
C
LAMP TEST
RB OUTPUT
RB INPUT
D
A
GND
INPUTS
INPUTS

SN74LS47N

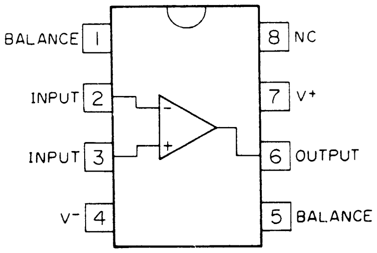

Vcc
CLEAR1
CLEAR2
CLOCK2
K2
J2
PRESET2
Q2
CLOCK1
K1
J1
PRESET1
Q1
Q̄1
Q̄2
GND
CLEAR
CLOCK
PRESET

SN74LS112AN

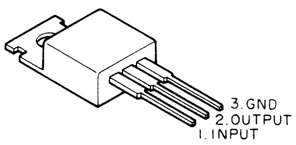
SEMICONDUCTORS


1 2 3 4 5 6 7
D1 G1 S1
Sub
S2 G2 D2

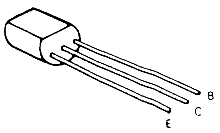
µPA68H


BALANCE 1
INPUT 2
INPUT 3
V⁻ 4
8 NC
7 V+
6 OUTPUT
5 BALANCE
−
+

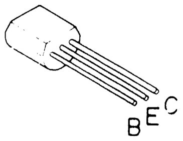
LF13741N


3.GND
2.OUTPUT
1.INPUT

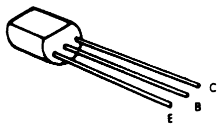
TA78020AP



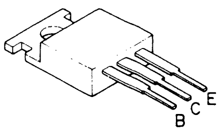
2SA844 (D)
2SA838 (B)
2SA1005 (K)
2SA1015 (Y)
2SC945 (Q)
2SC1345 (E)
2SC1907



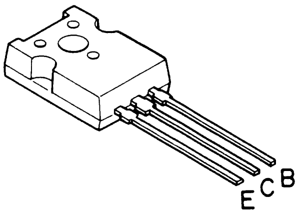
2SA1161
2SC2671
2SC3779 (D)



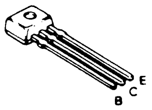
2SA1206 (K)



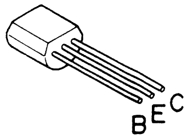
2SB834 (Y)
2SD88 (Y)



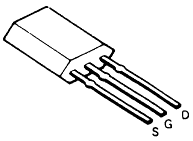
2SA1360 (Y)
2SC3423



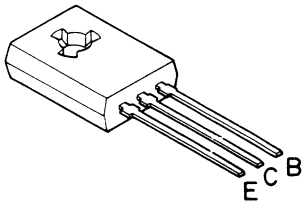
2SA1175 (F)
2SC2785 (F)



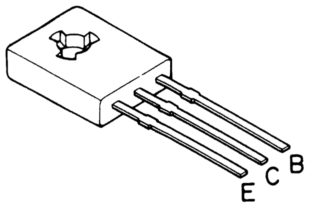
2SC2570A



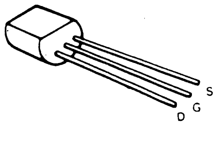
2SK304 (E)



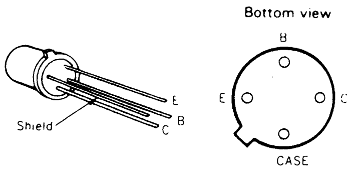
2SC1846



2SD668A (C)



2SK170 (V)


Bottom view
B
E
C
CASE
Shield
E
B
C

2SC1164 (O)